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FRANK A. TAYLOR
Director, United States National Museum

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SIFICATION OF THE WESTERN HEMISPHERE BALCLUTHA (HOMOPTERA: CICADELLIDAE)

By H. DERRICK BLOCKER

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Volume 122 1967 Number 3581

CLASSIFICATION OF THE WESTERN HEMISPHERE BALCLUTHA

(HOMOPTERA: CICADELLIDAE)[1]

By H. Derrick Blocker [2]

The genus *Balclutha* is cosmopolitan in distribution. This paper treats 36 taxa found in the Western Hemisphere including 2 which are given new status, 4 in new combinations, and 15 new to science. Although specimens of *Balclutha* are commonly collected in numbers in grassy areas, some taxa are based on single specimens or very short series. The genus is placed in the subfamily Deltocephalinae. It is considered a member of the tribe Balcluthini by Oman (1949) but is placed in Macrostelini by Linnavuori (1959); the former tribal designation is followed here. There have been few taxonomic works restricted to this tribe and these have included only a portion of the Western Hemisphere. This geographical restriction and the wide distribution of certain taxa have resulted in some confusion as to the identity of a number of species and subspecies. Ecological and biological data published on Balcluthini are infrequent. The host plants are usually considered to be grasses and sedges.

In this study, the internal male genitalia were dissected using techniques described by Oman (1949) and Young (1952). Illustrations

[1] Contribution from the Entomology Department, North Carolina Agricultural Experiment Station, Raleigh, N.C. Published with the approval of the Director of Research as Paper No. 2171 of the Journal Series.

[2] Department of Entomology, Kansas State University, Manhattan, Kans.

were drawn, using a camera lucida. The aedeagus, style, and connective were drawn at 150X; the male plate, valve, and pygofer, as well as the posterior margin of the female abdominal sternum VII, at 100X. A 0.1 mm scale for both magnifications is found in figure 1; all illustrations were drawn to this scale. The writer has used the terminology of Kramer (1950) for external structures, and of Young (1952) for internal. Descriptions and illustrations were made from long series of specimens unless stated otherwise. Geographical or seasonal variations were not found. Individual variations are illustrated. New scientific names, other than patronyms, should be considered arbitrary combinations of letters. A selective bibliography is included. Metcalf (in press) has compiled a complete list of references through 1955.

The Balcluthini can be separated from the closely related tribe Macrostelini by the appearance of the basal hind tarsomere which is distinctly sulcate basally in the Balcluthini. Both tribes can be separated from the remainder of the Deltocephalinae by the presence of only two anteapical cells in the forewing; there are almost always three anteapicals in the forewing of the remainder of the Deltocephalinae. The dorsal width of the head, including the eyes, compared to the width of the pronotum has been used to separate the Balcluthini into two genera by some workers. The author found no other characters correlated with head width and agrees with those workers who feel that this character is not stable enough for generic distinction.

The median length of the vertex compared to its length next to the eyes and the distance of each ocellus from its adjacent eye are useful although they vary somewhat within species. Other characters include the width of the anteclypeus and its relationship to the genae. Color of the head and of the species in general is quite variable, and its diagnostic value is generally secondary. The oblique brown lines present on each side of the midline of the face in many species, referred to as muscle maculae in an unrelated species of Cicadellidae by Kramer (1950), are of some value and are noted, when present, in the species descriptions. Few characters of the thorax and abdomen are used except those of the genital capsule and genitalia. Hind femoral chaetotaxy used so effectively by Ribaut (1952) as a generic character varies from 2–2–1 to 2–1–1 within *Balclutha*. The pronotal length in relation to the median length of the vertex is sometimes useful.

The most important structure used in differentiating species is the aedeagus. The shape of the male pygofer and plates as well as the connective and styles is used to supplement the characters found on the aedeagus. The shape of the apex of the connective is particularly useful in separating groups of species.

Females are usually quite similar to the males but are usually slightly larger. The only female character used in this study is the

shape of the posterior margin of the abdominal sternum VII. This structure separates several taxa within the Balcluthini, but there is much variation; hence, its use is supplementary.

The author is indebted to Professor David A. Young of North Carolina State University at Raleigh, who suggested this study and made several suggestions. Dr. Paul H. Freytag and Dr. James P. Kramer provided study facilities at Ohio State University and the U.S. National Museum, respectively, during visits to these institutions and made useful suggestions. Dr. S. L. Tuxen of Copenhagen, Denmark, has been most cooperative in answering questions concerning Fabrician type material.

Individuals and institutions who lent specimens were: Dr. Dwight M. DeLong of Ohio State University, specimens from his personal collection; Dr. Jírí Dlabola, the National Museum of Natural History, Prague, Czechoslovakia; Dr. Paul H. Freytag and Dr. C. A. Triplehorn, Ohio State University; Dr. T. Ishihara of Japan, personal collection; Dr. James P. Kramer, U.S. National Museum; Dr. Jean L. Laffoon, Iowa State University; R. Linnavuori of Finland, personal collection; Dr. George W. Byers, Snow Entomological Museum, University of Kansas; Dr. W. R. Richards, Canadian National Collection; Dr. Edward S. Ross, California Academy of Science; Dr. Jerome G. Rozen, American Museum of Natural History; Dr. A. Soós, Hungarian Natural History Museum, Budapest, Hungary; Miss Amy Suehiro, Bernice P. Bishop Museum; Dr. H. Weidner, Zoological Museum, Hamburg, West Germany; Dr. C. J. Davis, Hawaiian Department of Agriculture; Dr. G. G. E. Scudder, University of British Columbia; Dr. Jerry A. Powell, University of California at Berkeley.

Tribe Balcluthini Baker

TRIBAL NOMENCLATURE.—Baker (1915) proposed the name Balcluthini as a replacement name for Gnathodini, the generic name *Balclutha* Kirkaldy having earlier replaced *Gnathodus* Fieber, which was preoccupied.

DESCRIPTION.—Slender leafhoppers; variable in size; head from slightly wider than to distinctly narrower than pronotum; vertex from as long next to eye as medially, to distinctly longer medially; interocular width approximately three times median length; ocelli usually small, variable in their distance from adjacent eye; anteclypeus parallel margined or slightly wider apically; postclypeal sutures extending well past antennal pits to ocellocular area; transclypeal suture arched so that basal margin of anteclypeus is convex; gena slightly notched next to eye, joining anteclypeus as a very narrow band.

Thorax with pronotum slightly widest posteriorly, approximately three times as long as vertex; macropterous; forewings with four apical and two anteapical cells of which outermost is closed and innermost is open basally, appendix well developed; hindwings with inner fork of radius and outer fork of media confluent distally, only three apical cells; hind femoral chaetotaxy 2–1–1 or 2–2–1; basal hind tarsomere distinctly sulcate basally.

Male pygofer deeply incised on ventral border, setae pubescent, microsetae present in irregular patterns, with heavily sclerotized process present in several species; plates usually triangular, setae uniseriate along exterior margin; style with apical extension usually digitiform; connective Y-shaped; aedeagus usually simple but with processes arising on base or shaft in several species.

Color variable, from stramineous to brown to green; face with or without oblique brown lines on each side of midline; thoracic venter commonly darker than general body color; forewings hyaline to subhyaline with dark brown to reddish spots or stripes present in some species.

Genus *Balclutha* Kirkaldy

Gnathodus Fieber, 1866 (not Pander, 1856, [Polychaeta]), Verhandl. Zool.-Bot. Ges. Wien., vol. 16, p. 505. [Type by monotypy, *Cicada punctata* F. 1775.]

Balclutha Kirkaldy, 1900, Entomologist, vol. 33, p. 243. [New name for *Gnathodus* Fieber.]

Eugnathodus Baker, 1903, Invert. Pacifica, vol. 1, p. 1. [Type by original designation, *Gnathodus abdominalis* Van Duzee, 1892.]

Nesosteles Kirkaldy, 1906, Bull. Hawaiian Sugar Planters' Assoc. Expt. Sta. Div. Ent., vol. 1, p. 343. [Type by original designation, *Nesosteles hebe* Kirkaldy, 1906.]

Anomiana Distant, 1918, Fauna British India, vol. 7, p. 109. [Type by original designation, *Anomiana longula* Distant, 1918.]

Agellus DeLong and Davidson, 1933, Ohio Journ. Sci., vol. 33, p. 210. [Type by original designation, *Eugnathodus neglecta* DeLong and Davidson 1933.]

Key to Males of the Western Hemisphere[3]

1.	Head as wide as or wider than pronotum, if narrower, then pygofer with a heavily sclerotized process which is bifid apically	2
	Head narrower than pronotum	18
2(1).	Connective bifid apically, or at least with apical margin concave	3
	Connective truncate apically	11
3(2).	Pygofer with distinct heavily sclerotized process present on postero-ventral margin	4
	Pygofer without a process	6
4(3).	Pygofer process distinctly bifid apically, arising on inner surface; aedeagus with dorsal apodeme simple, shaft unevenly curved (fig. 19)	**rufofasciata** (Merino)

[3] *B. rosacea* (Osborn) is omitted because it is known only from the female.

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Pygofer process not bifid apically, arising on posteroventral margin; aedeagus not as above 5

5(4). Pygofer process directed ventrally, not dentate; aedeagus with dorsal apodeme expanded into two lateral lobes (fig. 20).
guajanae (DeLong)

Pygofer process directed posteromesally, dentate or not; aedeagus with three pairs of processes arising on dorsal apodeme (fig. 21).
hebe (Kirkaldy)

6(3). Aedeagus in posteroventral view with shaft broad and deeply bifid apically; forewing with third apical cell dark (fig. 27).
lineata (Osborn)

Aedeagus in posteroventral view with shaft not broad nor bifid apically; forewings with apical cells not dark 7

7(6). Aedeagus with shaft narrowed apically and strongly recurved (fig. 32).
knulli (Davidson and DeLong)

Aedeagus with shaft not recurved apically 8

8(7). Aedeagus with dorsal apodeme approximately one-third as long as shaft 9

Aedeagus with dorsal apodeme much less than one-third as long as shaft 10

9(8). Aedeagus with shaft evenly curved; style with preapical lobe broadly produced (fig. 29) . . . . . **flavescens** (Baker)

Aedeagus with shaft unevenly curved; style with preapical lobe as in figure 30 . . . . . **robusta** (Caldwell)

10(8). Aedeagus with shaft long, slender, curving anteriorly (fig. 22).
floridana (DeLong and Davidson)

Aedeagus with shaft short, expanded basally, curving dorsally (fig. 33).
sandersi (Davidson and DeLong)

11(2). Aedeagal shaft apex with overlapping lobes (fig. 28).
chiasma, new species

Aedeagal shaft without such lobes. 12

12(11). Aedeagus with pair of processes arising basally and dentate on posterior margin (fig. 26) . . . . . **denticula,** new species

Aedeagus without processes 13

13(12). Aedeagus with preatrium conspicuous 14

Aedeagus with preatrium very short or absent 15

14(13). Aedeagal shaft with apical one-half curved dorsally, preatrium conspicuously curved ventrally then anteriorly (fig. 24).
aridula Linnavuori

Aedeagal shaft with apical two-thirds curved dorsally, preatrium not or inconspicuously curved ventrally (fig. 23).
neglecta (DeLong and Davidson)

15(13). Aedeagus strongly curved anteriorly; connective with apex rectangular; style with preapical lobe subacutangular (fig. 31) . **curvata** Caldwell

Aedeagus curved dorsally or anterodorsally; connective with apex expanded and truncate; style with preapical lobe rounded . . . 16

16(15). Aedeagus with shaft as wide apically as dorsal apodeme, unevenly curved ventrally then dorsally (fig. 25) . . . . . **cochrani,** new species

Aedeagus with shaft much narrower apically than dorsal apodeme, or if not then shaft evenly curved dorsally or anterodorsally 17

17(16). Aedeagus with shaft regularly curved dorsally or slightly anterodorsally; forming less than a semicircle (fig. 34) . . . . **incisa** (Matsumura)
Aedeagus with shaft curved conspicuously anterodorsally, semicircular (fig. 35) . . . . . **diluta,** new species
18(1). Connective truncate apically 19
Connective bifid apically, or at least with apical margin concave . 27
19(18). Aedeagus with a pair of conspicuous long slender processes arising from dorsal apodeme; plates short and blunt (fig. 16) **youngi,** new species
Aedeagus not as above, processes, if present, arising from shaft; plates elongate 20
20(19). Aedeagus with preatrium conspicuous; shaft not bifid apically (fig. 15) . . . . . **obunca,** new species
Aedeagus with preatrium absent or inconspicuous; shaft bifid apically 21
21(20). Aedeagus with pair of processes arising from ventral margin of shaft and extending nearly to apex (fig. 9) . . . . . **krameri,** new species
Aedeagus not as above, processes, if present, greatly reduced and occurring as expansions on lateral margins of shaft 22
22(21). Aedeagus with shaft approximately four times as long as height of dorsal apodeme; plates extending as far posteriorly as pygofer apex; distance from eye to ocellus less than diameter of latter (fig. 18).
caldwelli, new species
Aedeagus with shaft approximately twice as long as height of dorsal apodeme; plates not extending as far posteriorly as pygofer apex; distance from eye to ocellus equal to or greater than diameter of latter 23
23(22). Aedeagus deeply bifid apically, gonoduct in posteroventral view widest apically. 24
Aedeagus not deeply bifid apically, or if so then gonoduct parallel margined. . . . . **abdominalis** (Van Duzee) . . 25
24(23). Aedeagus not expanded apically, shaft in posteroventral view sagittate apically (fig. 14) . . . . . **distincta** Linnavuori
Aedeagus conspicuously expanded apically, shaft not shaped as above (fig. 13) . . . . . **diversa,** new species
25(23). Aedeagus in posteroventral view with a pair of distinct small triangular processes on lateral margins at midlength of shaft, length 3.9 mm or greater . . . . . **abdominalis** (Van Duzee) . . 26
Aedeagus without such processes, or if present then rounded and inconspicuous; length 3.5 mm or less (fig. 10).
abdominalis abdominalis (Van Duzee)
26(25). Aedeagus with shaft expanded apically, deeply bifid in posteroventral view; from Panama (fig. 12) . . . . **a. amplissima,** new subspecies
Aedeagus with shaft not expanded apically, only slightly bifid in posteroventral view; from Brazil and Argentina (fig. 11).
a. fuscipennis Linnavuori, new status
27(18). Aedeagus with pair of processes arising from lateroventral margin of shaft near base (fig. 17) . . . . . **fuscina,** new species
Aedeagus without such processes. 28
28(27). Aedeagus with shaft short, curved dorsally; connective shallowly emarginate apically; from South America or Puerto Rico 29
Aedeagus with shaft long, curved anteriorly or distinctly anterodorsally; connective bifid apically; from North America or Mexico 30

29(28). Aedeagus irregularly curved dorsally, shaft conspicuously narrowed only at apex; connective with stem irregular anteapically, not strongly expanded apically; from Puerto Rico (fig. 7) . . **apicula,** new species

Aedeagus evenly curved dorsally, shaft gradually narrowed; connective with stem regular and expanded apically; from South America (fig. 8). **incompta,** new species

30(28). Aedeagus with shaft elongate, in profile always exceeding dorsal prolongation of an imaginary vertical line drawn across atrium; vertex usually slightly to conspicuously longer medially than next to eye. 31

Aedeagus with shaft not as elongate, not exceeding such a line, or only slightly so; vertex usually as long next to eye as medially (exceptions not uncommon) 33

31(30). Aedeagus with base nearly parallel margined; shaft narrowed abruptly, slender apically (fig. 6) . . . . . **arctica** Beirne

Aedeagus with base distinctly wider anteriorly, shaft gradually narrowed, slender apically (fig. 4) . . . . . **impicta** (Van Duzee) . . 32

32(31). Aedeagus with base greatly narrowed before shaft curves dorsally. **i. impicta** (Van Duzee)

Aedeagus with base gradually narrowed before shaft curves dorsally (fig. 5) . . . . . **i. arizona** Delong and Davidson, new status

33(30). Aedeagus with base very wide, shaft narrowed abruptly, appears to arise from posterodorsal margin of base; connective usually shallowly bifid at apex (fig. 3) . . . . . **mexicana,** new species

Aedeagus with base gradually narrowed, connective usually deeply bifid at apex . . . . . **punctata** (F.) . . 34

34(33). Aedeagus with shaft curved anterodorsally, base about four times as wide as apex of shaft (fig. 1) . . . . . **p. punctata** (F.)

Aedeagus with shaft curved conspicuously anteriorly, base more than six times as wide as apex of shaft (fig. 2) . . **p. patula,** new subspecies

Balclutha punctata punctata (Fabricius)

FIGURE 1

Cicada punctata Fabricius, 1775, Systema entomologiae, vol. 7, p. 687.

Cicada punctata Thunberg, 1784, Nova Acta Reg. Soc. Sci. Upsaliensis, vol. 4, p. 21. [Primary homonym.]

Typhlocyba rosea Provancher, 1872, Nat. Canadien, vol. 4, p. 378.

Typhlocyba jocosa Provancher, 1890, Petite faune entomologique du Canada, vol. 3, p. 300.

Gnathodus confusus Gillette and Baker, 1895, Bull. Colorado Agric. Expt. Sta., vol. 31, p. 104.

Gnathodus manitou Gillette and Baker, 1895, Bull. Colorado Agric. Expt. Sta., vol. 31, p. 105.

Gnathodus medius Baker, 1896, Canadian Ent., vol. 28, p. 38. [New synonymy.]

Gnathodus occidentalis Baker, 1896, Canadian Ent., vol. 28, p. 41.

Gnathodus livingstoni Baker, 1896, Canadian Ent., vol. 28, p. 42.

Balclutha california Davidson and DeLong, 1935, Proc. Ent. Soc. Washington, vol. 37, p. 102.

Length of male 3.6 to 4.4 mm, of female 3.7 to 4.4 mm; head width of male .775 to .900 mm, of female .850 to .950 mm; pronotal width of male .850 to 1.025 mm, of female .900 to 1.050 mm.

Head distinctly narrower than pronotum; vertex usually no longer medially than next to eye, but distinctly longer medially in some specimens, interocular width more than 3 times median length; ocellus located at a distance of from 1½ to 2 times its diameter from eye; anteclypeus widest apically, exceeding gena; postclypeal suture parallel above antennal pits; pronotum more than three times as long as vertex; hind femoral chaetotaxy 2–1–1; female with posterior margin of abdominal sternum VII truncate, occasionally slightly sinuate.

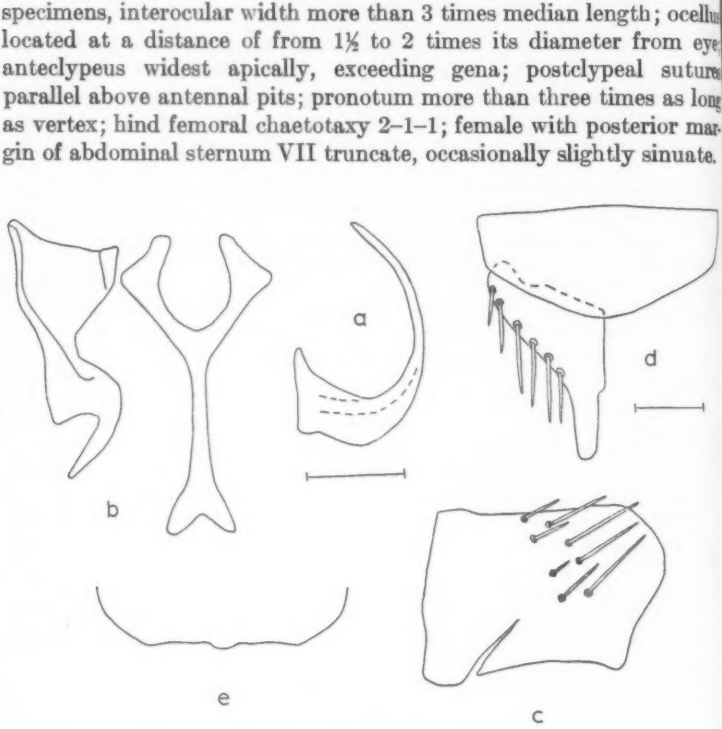

FIGURE 1.—*B. p. punctata: a*, aedeagus, lateral view, 0.1 mm scale; *b*, style and connective, dorsal view; *c*, male pygofer, lateral view; *d*, valve and plate, ventral view, 0.1 mm scale; *e*, female abdominal sternum VII, ventral view.

Male pygofer with less than 15 setae, posteroventral margin with a small rounded projection; plates broadly triangular, extending posteriorly as far as pygofer apex; connective expanded apically and bifid, longer than style, stem longer than arms, angle between arms rounded; style with preapical lobe rounded, apical extension rounded apically; aedeagus broad at base, parallel margined for approximately basal one-third then narrowed, shaft slender.

Color from pale green to dull brown; face commonly with oblique brown lines on each side of midline; vertex and pronotum commonly with orange markings, pronotum commonly with dark longitudinal

bands; forewings hyaline to subhyaline commonly with an irregular number of brown spots; abdominal dorsum dark.

Fabricius' type material, according to Dr. S. L. Tuxen (in litt., Universitets Zoologiske, Krystalgade, Copenhagen, Denmark) has been lost. A neotype male from Alt. Reddewitz at Rugen leg., VIII-1930 (Korschefsky), is hereby designated and deposited in the Zoological Museum of Copenhagen. *Cicada punctata* Thunberg is here regarded not only as a primary homonym, but also as a junior synonym, but his type material has not been located. A paratype male of *B. californica* from the DeLong collection has been examined. Holotype female of *G. medius* Baker and two cotypes (female) of *G. livingstoni* Baker from the U.S. National Museum have been examined. Cotypes (one male and one female) of *G. occidentalis* Baker from the U.S. National Museum have also been examined; the male specimen is hereby designated lectotype. Type material of *T. rosea* Provancher, *T. jocosa* Provancher, *G. confusus* Gillette and Baker, and *G. manitou* Gillette and Baker has not been examined. These species have been listed as synonyms of *B. punctata* by Beirne (1950), and he is followed here. Additional specimens examined were from Alaska, Arizona, California, Colorado, Florida (one specimen), Idaho, Maine, Michigan, Montana, New Hampshire, New Mexico, New York, Oregon, Utah, Vermont, Washington, Wisconsin, Wyoming, Ontario, British Columbia, and Quebec.

B. punctata (F.) is holarctic in distribution and is commonly found throughout its range. It is closely related to *B. impicta* (Van Duzee), but can be distinguished by the shape of the aedeagal shaft which is much shorter than *impicta* (see key).

***Balclutha punctata patula*, new subspecies**

FIGURE 2

Length of male 4.0 to 4.7 mm, of female 4.0 to 4.3 mm; head width of male .850 to .950 mm, of female .925 to .950 mm; pronotal width of male .950 to 1.025 mm, of female .975 to 1.050 mm.

As *B. p. punctata* but aedeagus with basal one-third broad, shaft slender.

Holotype male and paratype males from Moscow Mountain, Idaho, June 4, 1936 (C. B. Philip), deposited in the collection at The University of Kansas. Additional specimens examined from Arizona (July), Idaho (June), Minnesota (Aug.), Maine (Aug.), New Hampshire (July), New Mexico, New York (Aug.), Washington (July), West Virginia (June), British Columbia (Aug.), and Manitoba (Aug.).

B. punctata patula, new subspecies, can be distinguished from *B. punctata* (Fabricius) only by the broader base of the aedeagus. This structure is also similar to *B. arctica* Beirne but can be distinguished by the shorter length of the shaft of the aedeagus in *p. patula*.

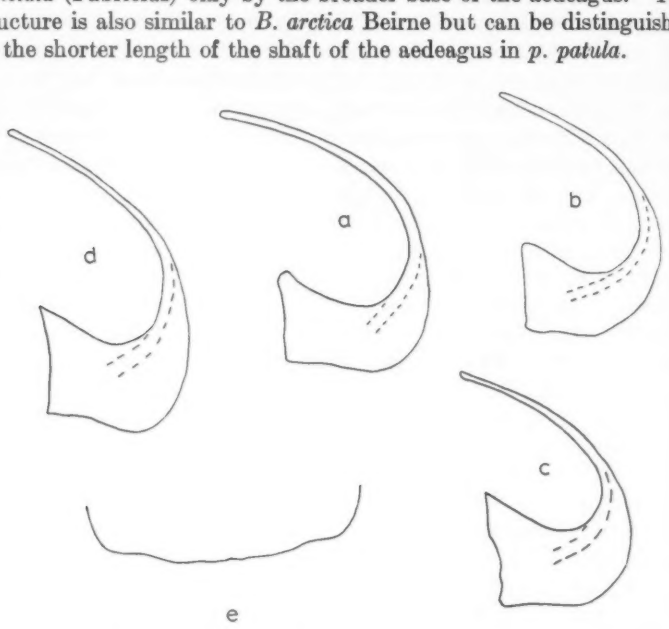

FIGURE 2.—*B. punctata patula: a–d*, aedeagus, lateral view; *e*, female abdominal sternum VII, ventral view.

Balclutha mexicana, new species

FIGURE 3

Length of male 3.5 to 3.7 mm, of female 3.8 to 3.9 mm; head width of male .825 to .875 mm, of female .850 to .875 mm; pronotal width of male .875 to .925 mm, of female .925 to .975 mm.

Head narrower than pronotum; vertex as long next to eye as medially or occasionally slightly longer in some specimens, interocular width more than three times median length; ocellus located at a distance approximately twice its diameter from eye; anteclypeus widest apically, slightly exceeding gena; postclypeal sutures parallel above antennal pits; pronotum more than three times as long as vertex; hind femoral chaetotaxy 2–2–1; female with posterior margin of abdominal sternum VII sinuate posteriorly.

Male pygofer with less than 15 setae; plates broadly triangular, extending posteriorly as far as pygofer apex; connective expanded

apically, only slightly bifid, longer than style, stem longer than arms, angle between arms rounded; style with preapical lobe rounded, apical extension acute apically; aedeagus very broad basally, shaft slender, curved dorsally then anteriorly.

Color greenish brown; face without oblique brown lines; thoracic venter dark; forewings hyaline, tinted greenish brown; abdominal dorsum dark.

Holotype and paratype males from Saltillo Coah. [Mexico], Sept. 23, 1941 (DeLong, Good, Caldwell, and Plummer), deposited

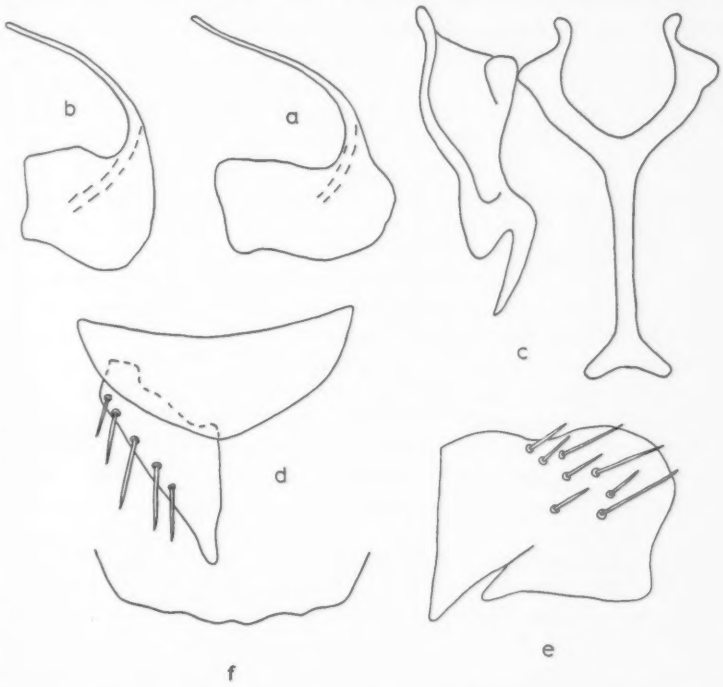

FIGURE 3.—*B. mexicana: a, b,* aedeagus, lateral view; *c,* style and connective, dorsal view; *d,* valve and plate, ventral view; *e,* male pygofer, lateral view; *f,* female abdominal sternum VII, ventral view.

in the DeLong collection. A female specimen, same label data, and three specimens from Distrito Federal, Mexico, have also been examined.

B. mexicana, new species, is closely related to *B. punctata* (Fabricius) but can be readily distinguished by the shape of the aedeagus which is much broader basally in *mexicana.*

Balclutha impicta impicta (Van Duzee)

FIGURE 4

Gnathodus impictus Van Duzee, 1892, Canadian Ent., vol. 24, p. 113.
Gnathodus impictus var. *flavus* Baker, 1896, Canadian Ent., vol. 28, p. 38.
Gnathodus viridis Osborn, 1905, Bull. New York State Mus., vol. 97, p. 541.
Balclutha impicta var. *maculata* Davidson and DeLong, 1935, Proc. Ent. Soc. Washington, vol. 37, p. 101.
Balclutha osborni Van Duzee, 1916, Check list of Hemiptera, p. 75.

Length of male 3.5 to 4.2 mm, of female 3.6 to 4.0 mm; head width of male .750 to .875 mm, of female .750 to .850 mm; pronotal width of male .825 to 1.000 mm, of female .825 to .950 mm.

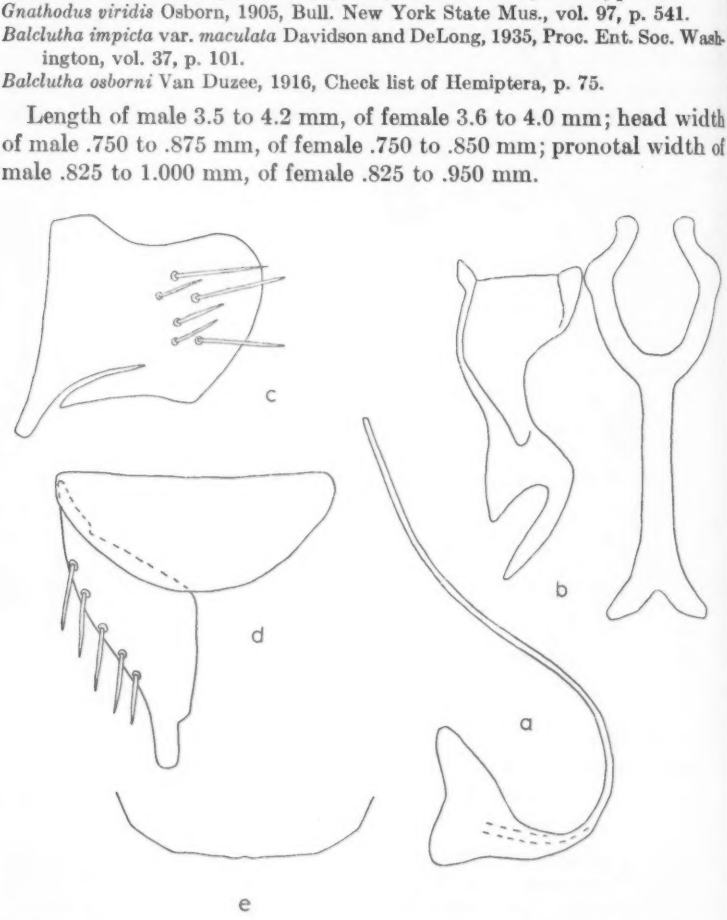

FIGURE 4.—*B. i. impicta: a*, aedeagus, lateral view; *b*, style and connective, dorsal view; *c*, male pygofer, lateral view; *d*, valve and plate, ventral view; *e*, female abdominal sternum VII, ventral view.

Head distinctly narrower than pronotum; vertex usually slightly longer medially than next to eye, interocular width more than 3 times median length, ocellus located at a distance of from 1½ times its

diameter or farther from eye; anteclypeus widest apically, exceeding gena; postclypeal sutures parallel above antennal pits; pronotum 3 times as long as vertex, hind femoral chaetotaxy 2–2–1; female with posterior margin of abdominal sternum VII truncate, occasionally slightly sinuate apically.

Male pygofer with less than 15 setae; plates broadly triangular; connective widest apically and deeply bifid, longer than style, stem longer than arms, angle between arms rounded; style with preapical lobe acute, apical extension long, acute apically; aedeagus broad basally, shaft very narrow, long, curved dorsally then anteriorly.

Color from stramineous to green or brown; face commonly with faint oblique brown lines on each side of midline; vertex, pronotum, and scutellum commonly with brown and orange markings; thoracic venter commonly dark; forewings hyaline to subhyaline, commonly tinted as body color, less commonly with irregular number of dark brown spots; abdominal dorsum dark.

The male lectotype (selected by P. W. Oman) from New Jersey, located at Iowa State University, has been examined. Cotype females of *G. impictus* var. *flavus* Baker from the U.S. National Museum and paratype males of *B. impicta* var. *maculata* Davidson and DeLong from the DeLong collection have been examined. The female holotype of *B. osborni* Van Duzee from the collection of Ohio State University has also been examined. Additional specimens examined were from Arkansas, Connecticut, Delaware, District of Columbia, Georgia, Indiana, Iowa, Kansas, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Vermont, Virginia, Wisconsin, Ontario, and the Virgin Islands (one specimen).

B. i. impicta (Van Duzee) is closely related to *B. punctata* (F.) and *B. arctica* Beirne. It is quite variable in color and is generally common throughout its range. It can be distinguished from other species by the shape of the aedeagus (see key).

Balclutha impicta arizona Davidson and DeLong, new status

FIGURE 5

Balclutha arizona Davidson and DeLong, 1935, Proc. Ent. Soc. Washington, vol. 37, p. 100.

Length of male 4.1 to 4.6 mm, of female 4.1 to 5.1 mm; head width of male .900 to .975 mm, of female .925 to 1.025 mm; pronotal width of male .950 to 1.050 mm, of female .950 to 1.125 mm.

Characters as in *B. i. impicta* with some variations; anteclypeus parallel margined or slightly wider apically; pronotum three times as

long as vertex or slightly less; female with posterior margin of abdominal sternum VII truncate or occasionally slightly produced apically; aedeagus broad basally, shaft with only basal three-fourths narrowed.

Paratype male from Arizona located in the Delong collection has been examined. Additional specimens were from Arizona (June to Sept.), Colorado, New Mexico (June and July), and Mexico (Sept.).

B. impicta arizona Davidson and DeLong is herein considered a western subspecies of *B. impicta* (Van Duzee) since the only definite

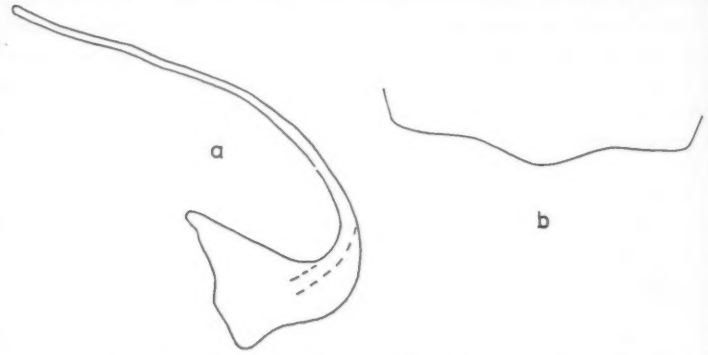

FIGURE 5.—*B. impicta arizona: a*, aedeagus, lateral view; *b*, female abdominal sternum VII, ventral view.

morphological difference is found in the base of the aedeagus which is not narrowed as abruptly as in *impicta*. The subspecies is also generally larger in size.

Balclutha arctica Beirne

FIGURE 6

Balclutha arctica Beirne, 1950, Canadian Ent., vol. 82, p. 124.

Length of male 4.0 to 4.6 mm, of female 4.5 to 5.0 mm; head width of male .900 to 1.000 mm, of female .950 to 1.000 mm; pronotal width of male .975 to 1.100 mm, of female .975 to 1.150 mm.

Head narrower than pronotum; vertex longer medially than next to eye, interocular width more than three times median length; ocellus located at a distance of from twice its diameter or farther from eye; anteclypeus parallel margined or slightly wider apically, usually slightly exceeding gena; postclypeal sutures parallel above antennal pits; pronotum more than three times as long as vertex; hind femoral chaetotaxy 2–2–1; female with posterior margin of abdominal sternum VII truncate posteriorly.

Male pygofer as *impicta* but sometimes with rounded projection on posteroventral margin; plates as *impicta*; connective expanded apically, slightly bifid, longer than style, stem longer than arms, angle between arms rounded; style with preapical lobe rounded, apical extension long, rounded apically; aedeagus broad basally, with

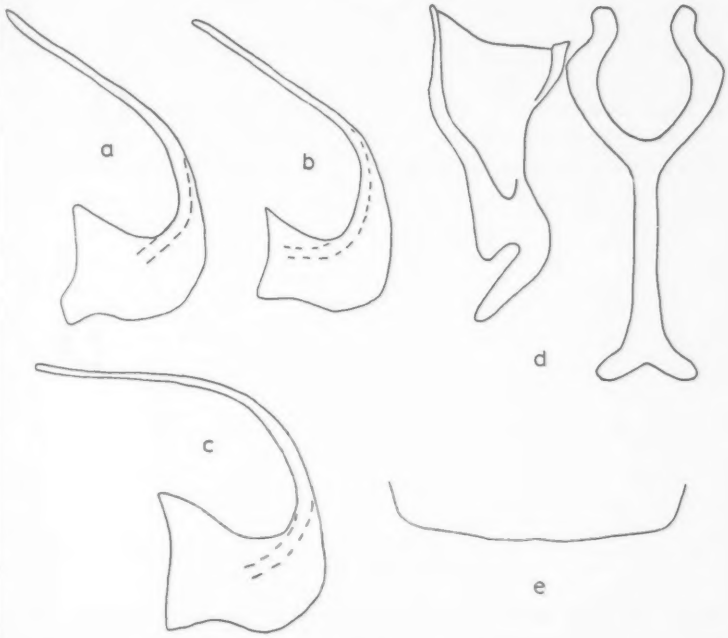

FIGURE 6.—*B. arctica: a–c*, aedeagus, lateral view; *d*, style and connective, dorsal view; *e*, female abdominal sternum VII, ventral view.

basal one-third approximately parallel margined, shaft narrowed, slender, curved dorsally then anteriorly.

Color from stramineous to light green to brown; face commonly with faint oblique brown lines on each side of midline; thoracic venter commonly dark; forewings hyaline to subhyaline; abdominal dorsum dark.

The male holotype from Dawson, Yukon (June), is in the Canadian National collection. Material compared with type by B. P. Beirne has been examined. Additional material examined was from British Columbia and Northwest Territory (July), Idaho (July), Montana (June and July), New Mexico (June and July), Wyoming (July), and Frio, D. F. [Mexico] (Oct. and Nov.).

B. arctica Beirne is very closely related to *B. impicta* (Van Duze but can be distinguished from this species by the shape of the aedeagu which is broad with the basal one-third almost parallel margined *arctica*.

***Balclutha apicula*, new species**

FIGURE 7

Length of male 3.5 mm; head width .875 mm; pronotal widt 1.000 mm; female unknown.

Head narrower than pronotum; vertex longer medially than nex to eye, interocular width three times median length; ocellus locate at a distance approximately twice its diameter from eye; anteclypeu

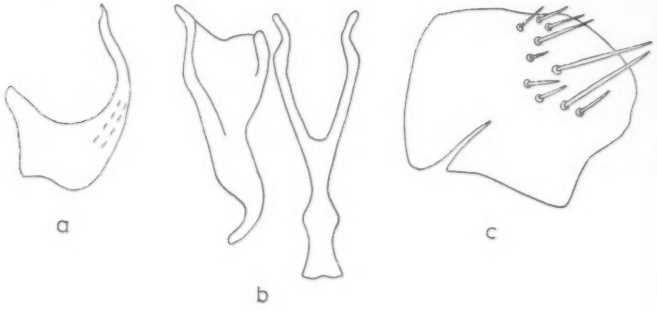

FIGURE 7.—*B. apicula: a*, aedeagus, lateral view; *b*, style and connective, dorsal vie *c*, male pygofer, lateral view.

wider apically, exceeding gena; postclypeal sutures parallel above antennal pits; pronotum three times as long as vertex; hind femoral chaetotaxy 2–2–1.

Male pygofer with less than 15 setae, ventral margin broadly produced; connective slightly longer than style, stem irregular anteapically, not strongly expanded apically and slightly bifid, approximately equal in length to arms which are slender; style with preapical lobe inconspicuous, apical extension curved laterally, rounded apically; aedeagus broad basally, shaft gradually tapered, irregularly curved dorsally, acute apically.

Color stramineous; forewings subhyaline.

Holotype male from Mayaguez, Puerto Rico, Aug. 24–29, 1914, deposited in the American Museum of Natural History.

B. apicula, new species, appears to be related to *B. punctata* (F.) but can be distinguished by the shape of the aedeagus, style and connective (see key).

***Balclutha incompta*, new species**

FIGURE 8

Length of male 3.2 mm; head width .700 mm; pronotal width .800 mm; female unknown.

Head narrower than pronotum; vertex as long next to eye as medially, interocular width more than three times median length; ocellus located at a distance more than its diameter from eye; anteclypeus widest apically, slightly exceeding gena; postclypeal sutures parallel above antennal pits; pronotum more than three times as long as vertex; hind femoral chaetotaxy 2–2–1.

Male pygofer with less than 10 setae, posteroventral margin slightly produced; plates slender, triangular, extending posteriorly as far as pygofer apex; connective expanded apically, slightly bifid, equal

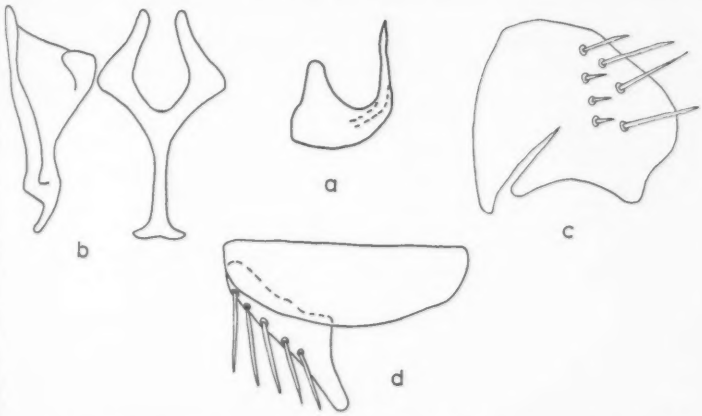

FIGURE 8.—*B. incompta: a*, aedeagus, lateral view; *b*, style and connective, dorsal view; *c*, male pygofer, lateral view; *d*, valve and plate, ventral view.

in length to style; stem and arms equal in length with angle between arms rounded; style with preapical lobe rounded, apical extension slightly curved and rounded apically; aedeagus simple, shaft gradually tapered and curved dorsally, apex acute.

Color green; face without oblique brown lines; thoracic venter not dark; forewings subhyaline with green tint.

Holotype male from Rio Huagra-Yacu, Oriente, Ecuador, April 1941, 900 meters (Clarke-Macintyre), on indefinite loan to the U.S. National Museum from N.C. State University.

B. incompta, new species, appears to be closely related to *B. apicula*, new species, but can be distinguished by the shape of the aedeagus (see key).

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***Balclutha krameri*, new species**

FIGURE 9

Length of male unknown; head width of male .925 mm; pronotal width of male .975 mm; female unknown.

Head narrower than pronotum; vertex as long next to eye as medially, interocular width more than three times median length; ocellus located at a distance approximately its diameter from eye; anteclypeus widest apically, slightly exceeding gena; postclypeal sutures parallel above antennal pits; pronotum more than three times as long as vertex.

Male pygofer with less than 15 setae, incised on posterior margin; plates triangular, slender, not extending as far posteriorly as pygofer apex; connective expanded apically and truncate, equal to style in length, stem longer than arms; style with preapical lobe rounded.

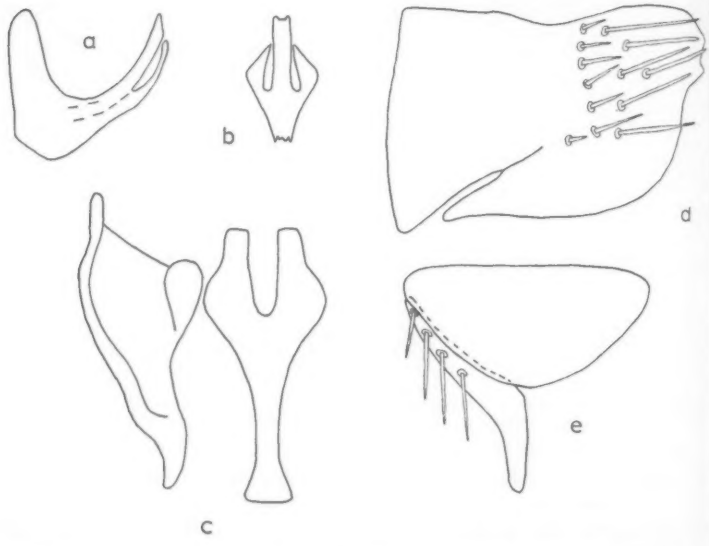

FIGURE 9.—*B. krameri: a*, aedeagus, lateral view; *b*, aedeagal shaft, posteroventral view; *c*, style and connective, dorsal view; *d*, male pygofer, lateral view; *e*, valve and plate, ventral view.

apical extension slightly curved, rounded apically; aedeagus with dorsal apodeme prominent, shaft slender, curved dorsally with a pair of processes arising from ventral margin and extending nearly to apex.

Color green.

Holotype male, Costa Rica (Pablo Schild), in U.S. National Museum. This species was described from a single specimen of which only the head, prothorax, and abdomen remain.

B. krameri, new species, is related to *B. abdominalis* (Van Duzee) but can be easily distinguished by the shape of the aedeagus which is distinctive (see key). This species is named in honor of Dr. James P. Kramer of the U.S. National Museum, who furnished the author much of the material used in this study and made many valuable suggestions during the time that this research was being conducted.

***Balclutha abdominalis abdominalis* (Van Duzee)**

FIGURE 10

Gnathodus abdominalis Van Duzee, 1892, Canadian Ent., vol. 24, p. 113.
Balclutha hyalina Osborn, 1926, Ann. Ent. Soc. America, vol. 19, p. 352. [New synonymy.]

Length of male 3.0 to 3.5 mm, of female 3.5 to 3.6 mm; head width of male .675 to .775 mm, of female .775 to .850 mm; pronotal width of male .700 to .850 mm, of female .825 to .875 mm.

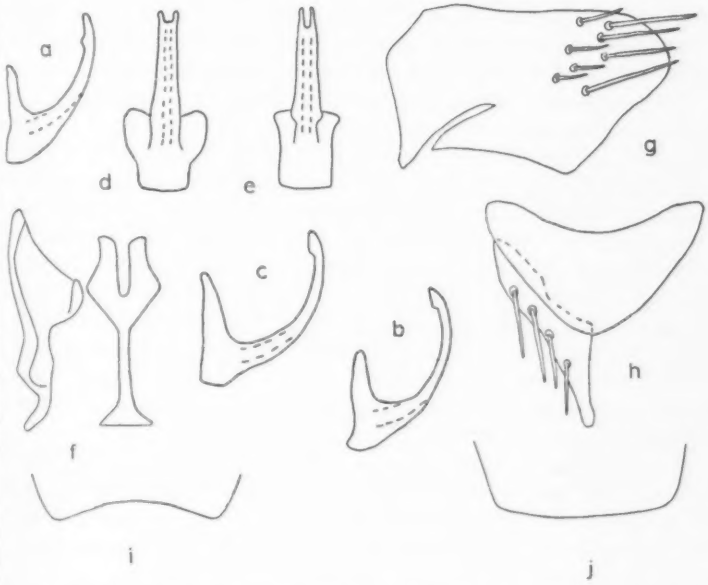

FIGURE 10.—*B. a. abdominalis: a–c*, aedeagus, lateral view; *d*, *e*, aedeagus, posteroventral view; *f*, style and connective, dorsal view; *g*, male pygofer, lateral view; *h*, valve and plate, ventral view; *i*, *j*, female abdominal sternum VII, ventral view.

Head narrower than pronotum but only slightly so in some specimens; vertex usually as long next to eye as medially but occasionally longer medially, interocular width more than three times median length; ocellus located at a distance of from one to two times its diameter from eye; anteclypeus parallel margined or slightly wider apically, not exceeding gena; postclypeal sutures parallel above antennal pits; pronotum approximately three times as long as vertex; hind femoral chaetotaxy 2–2–1; female with posterior margin of abdominal sternum VII truncate or slightly concave posteriorly.

Male pygofer with less than 15 setae, ventral margin produced, posteroventral border more heavily sclerotized, a heavily sclerotized band extending vertically through setal area; plates slender, triangular, not extending as far posteriorly as pygofer apex; connective expanded and truncate apically, two-thirds length of style, stem slightly longer than arms, arms thickened, with angle between arms acute; style with preapical lobe rounded, apical extension curved laterally and rounded; aedeagus with dorsal apodeme conspicuous, shaft evenly curved dorsally, slightly expanded apically, bifid apically in posteroventral view; processes on shaft inconspicuous if present.

Color stramineous to green; face with or without faint oblique brown lines on each side of midline; thoracic venter not dark; forewings hyaline to subhyaline, commonly tinted as body color.

The male lectotype (selected by P. W. Oman) from Jamesburg, N.J., is deposited in the collection at Iowa State University and has been examined. The male holotype of *B. hyalina* Osborn, from Cuba, is located at the U.S. National Museum and has also been examined. This is a widespread and variable species. Additional specimens have been examined from the states of Alabama, Arizona, Connecticut, District of Columbia, Florida, Georgia, Iowa, Kansas, Maryland, Michigan, Mississippi, Missouri, New Hampshire, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Tennessee, Texas, Virginia, West Virginia, Wisconsin, and Ontario. Other specimens examined were from Mexico, Puerto Rico, Cuba, Trinidad Island, British Honduras, Guatemala, Costa Rica, and Peru. This species has been collected from sedge in Cuba.

B. a. abdominalis (Van Duzee) appears to be closely related to several other species. It can be distinguished best by the shape of the aedeagus of which the shaft is evenly curved, expanded apically and on which, if lateral projections are present, they are inconspicuous.

***Balclutha abdominalis fuscipennis* Linnavuori, new status**

FIGURE 11

Balclutha fuscipennis Linnavuori, 1954, Ann. Ent. Fennici, vol. 20, pp. 60, 61.

Length of male 3.9 or 4.5 mm; head width .850 mm; pronotal width .925 mm; female unknown.

Characters as in *B. a. abdominalis* except connective not greatly expanded apically, stem widened; aedeagus wide basally, shaft curved

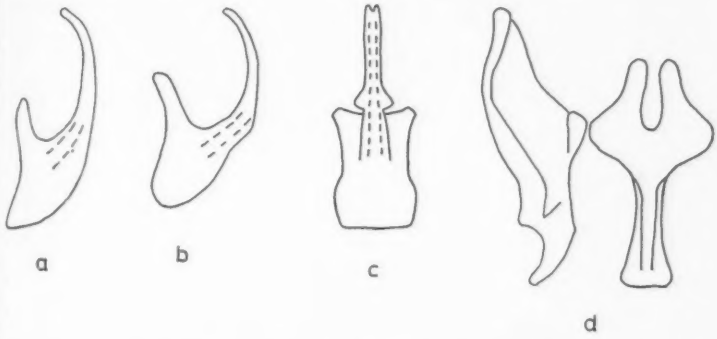

FIGURE 11.—*B. abdominalis fuscipennis: a, b,* aedeagus, lateral view; *c,* aedeagus, posteroventral view; *d,* style and connective, dorsal view.

anterodorsally, not expanded apically, in posteroventral view with a distinct pair of lateral triangular processes, slightly bifid apically.

Color brown to brownish green; face with faint oblique brown lines on each side of midline; thoracic venter not dark; forewings subhyaline with brown tint.

The male holotype from Tucaman, Lules, Argentina, Nov. 13, 1953 (Wygodzinsky), is in the collection of R. Linnavuori and has been examined. An additional specimen from Curitiba, Parana, Brazil, July 1961 (N. L. H. Krauss), in the U.S. National Museum has been examined.

B. a. fuscipennis Linnavuori is closely related to the nominate subspecies but can be distinguished by the pair of lateral triangular processes on the aedeagus. This subspecies is also distinctly larger in size.

***Balclutha abdominalis amplissima*, new subspecies**

FIGURE 12

Length of male 4.6 to 4.7 mm, of female 4.7 mm; head width of ma .950 to .975 mm, of female, .975 mm; pronotal width of male 1.075 t 1.100 mm, of female 1.100 mm.

Characters as *B. a. abdominalis;* connective as *B. a. fuscipenni* aedeagus robust, slightly expanded apically; shaft in posteroventra

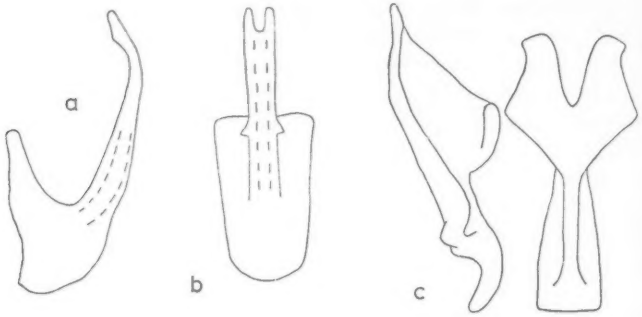

FIGURE 12.—*B. abdominalis amplissima: a*, aedeagus, lateral view; *b*, aedeagus, poster ventral view; *c*, style and connective, dorsal view.

view with pair of distinct lateral triangular processes, deeply bifi apically.

Color brown; face with faint oblique brown lines on each side o midline; thoracic venter slightly darkened; forewings subhyaline wit tan tint.

Holotype male, Cerro Punta, Panama, Dec. 10, 1952 (F. S. Blanton) in the U.S. National Museum. One male paratype at North Carolin State University. This subspecies was described from a series o three male specimens and one female specimen, all with the same labe data.

B. abdominalis amplissima, new subspecies, can be distinguished from the nominate subspecies by its larger external size and by th larger size of the aedeagus. It can be distinguished from *B. a. fuscipennis* Linnavuori by the larger size of the aedeagus and by th expanded apex of the shaft which is also more deeply bifid.

***Balclutha diversa*, new species**

FIGURE 13

Length of male 3.9 to 4.2 mm, of female 3.7 to 4.2 mm; head width of male .825 to .850 mm, of female .825 to .975 mm; pronotal width o male .925 to .975 mm, of female .925 to 1.025 mm.

Head distinctly narrower than pronotum; vertex as long next to eye as medially or occasionally slightly longer medially, interocular width more than three times median length; ocellus located at a distance of from one to two times its diameter from eye; anteclypeus slightly wider apically, not exceeding gena; postclypeal sutures parallel above antennal pits; pronotum more than three times as long as vertex; hind femoral chaetotaxy 2–2–1; female with posterior margin of abdominal sternum VII truncate or slightly concave posteriorly.

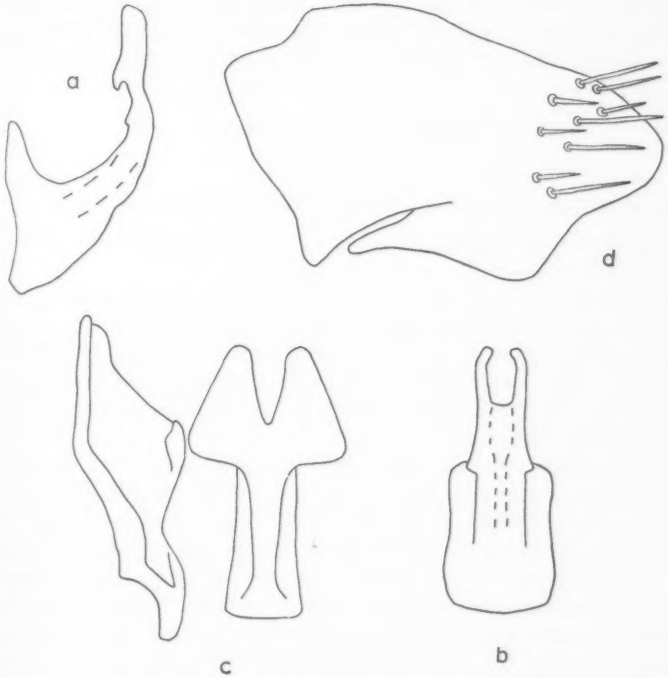

FIGURE 13.—*B. diversa: a*, aedeagus, lateral view; *b*, aedeagus, posteroventral view; *c*, style and connective, dorsal view; *d*, male pygofer, lateral view.

Male pygofer and plates as *B. abdominalis* (Van Duzee); connective truncate apically, not expanded, shorter than style, stem longer than arms which are broad, angle between arms acute; style with preapical lobe angled, apical extension only slightly curved, rounded apically;

aedeagus broad basally, shaft irregularly curved dorsally, conspicuously expanded apically, in posteroventral view with a pair of small triangular processes present on lateral margin, deeply bifid apically.

Color green; face without oblique brown lines; thoracic venter dark; forewings subhyaline.

Holotype male, Orizaba, V. C. [Mexico], Oct. 8, 1941 (DeLong, Good, Caldwell, and Plummer), and male paratypes, same data, in the DeLong collection. This species was described from a series of six male and five female specimens. An additional specimen from Fortin, V. C., Mexico, Oct. 9, 1941, was also examined.

B. diversa, new species, is very closely related to *B. abdominalis amplissima*, new subspecies, but can be distinguished by the shape of the aedeagus which is conspicuously more expanded apically and more deeply bifid.

Balclutha distincta Linnavuori

FIGURE 14

Balclutha distincta Linnavuori, 1959, Ann. Zool. Soc. 'Vanamo,' vol. 20, p. 345.

Length of male 3.8 mm; head width .800 mm; pronotal width .875 mm; female unknown.

Head narrower than pronotum; vertex slightly longer medially than next to eye, interocular width approximately three times median length; ocellus located at a distance of approximately 1½ times its diameter from eye; anteclypeus wider apically, exceeding genae; postclypeal sutures parallel above antennal pits; pronotum three times as long as vertex.

Male pygofer with less than 10 setae, narrowed posteriorly, dorsal and posteroventral margins heavily sclerotized; plates slender, triangular, not extending as far posteriorly as pygofer apex; connective expanded apically and truncate; stem slightly longer than arms which are thickened, with angle between arms acute; style with preapical lobe rounded, apical extension curved laterally, rounded apically; aedeagus broad basally, shaft with irregular margins, curved dorsally, in posteroventral view with small lateral triangular processes, apex deeply bifid, expanded.

Color tan to green.

The male holotype, Coronado, Costa Rica, Aug. 15, 1931 (F. Nevermann), in the Hungarian Natural History Museum, Budapest, has been examined. An additional male specimen from Costa Rica in the U.S. National Museum has also been examined.

B. distincta Linnavuori is closely related to *B. diversa*, new species, but can be distinguished by the shape of the aedeagus which, in posteroventral view, is more expanded apically than *diversa*. The apex of the aedeagus is sagittate in *distincta*.

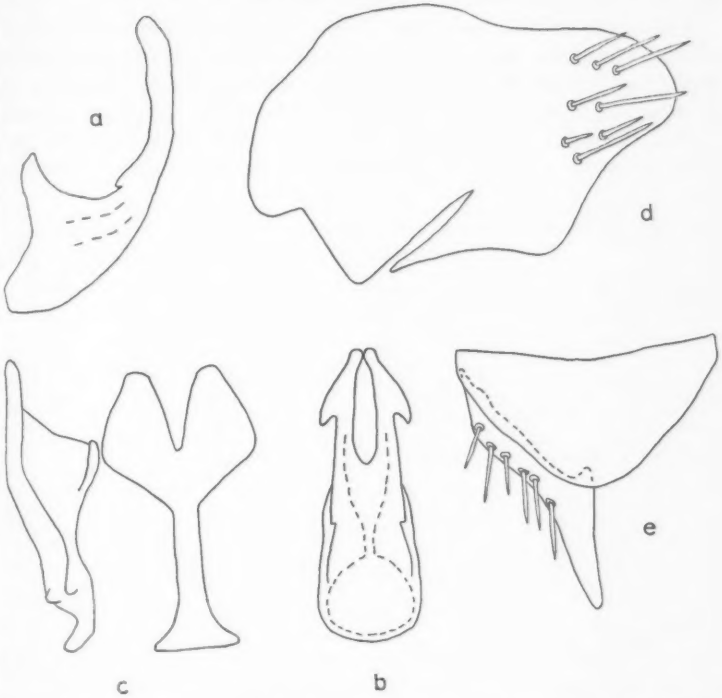

FIGURE 14.—*B. distincta: a*, aedeagus, lateral view; *b*, aedeagus, posteroventral view; *c*, style and connective, dorsal view; *d*, male pygofer, lateral view; *e*, valve and plate, ventral view.

Balclutha obunca, new species

FIGURE 15

Length of male 4.0 to 4.1 mm, of female 4.1 to 4.5 mm; head width of male .875 to .925 mm, of female .925 to .950 mm; pronotal width of male .975 to 1.000 mm, of female 1.025 to 1.075 mm.

Head narrower than pronotum; vertex as long next to eye as medially or occasionally slightly longer medially, interocular width three times median length; ocellus located at a distance of from one to two times

its diameter from eye; anteclypeus slightly wider apically, equal to c slightly exceeding gena; postclypeal sutures parallel above antenna pits; pronotum three times as long as vertex; hind femoral chaetotax 2–2–1; female with posterior margin of abdominal sternum VII trun cate apically, posteroventral margins oblique.

Male pygofer with less than 15 setae, deeply incised in apical hal of dorsal margin, ventral margin broadly produced; plates broadly triangular, not constricted apically, extending posteriorly as far as pygofer apex; connective not expanded apically, truncate, approxi mately equal in length to style, stem longer than arms, angle betwee arms rounded; style with preapical lobe rounded, apical extensio

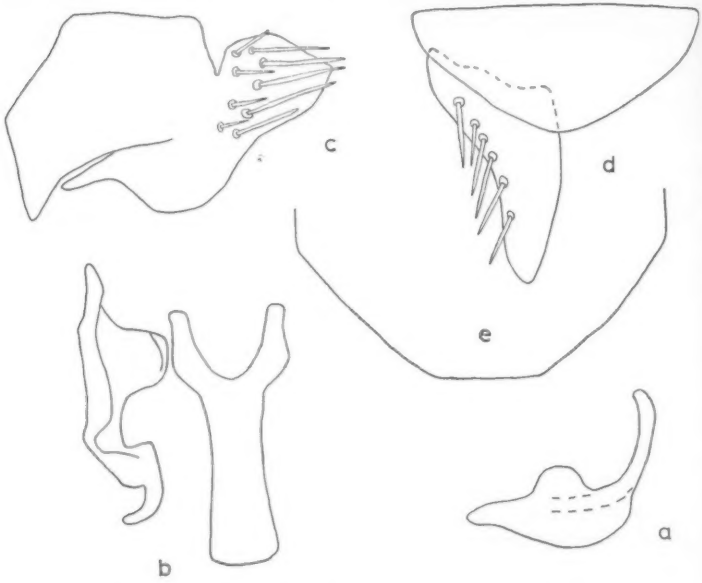

FIGURE 15.—*B. obunca: a*, aedeagus, lateral view; *b*, style and connective, dorsal view; *c*, male pygofer, lateral view; *d*, valve and plate, ventral view; *e*, female abdominal sternum VII, ventral view.

strongly curved laterally, rounded apically; aedeagus robust basally, preatrium conspicuous, dorsal apodeme short and rounded, shaft slender, curved dorsally.

Color light to dark brown; face without oblique brown lines; pronotum commonly with longitudinal orange or brown lines, scutellum with orange areas; thoracic venter not dark; forewings hyaline with brown tint.

Holotype male, Nova Teutonia, Santa Catarina, Brazil, Apr. 27, 1950 (F. Plaumann), on indefinite loan to U.S. National Museum from North Carolina State University. Three male paratypes at North Carolina State University. This species was described from seven male and seven female specimens, all from Brazil (March, April, and July).

B. obunca, new species, appears to be related to *B. abdominalis* (Van Duzee) but can be distinguished by the shape of the aedeagus and the deeply incised ventral margin of the pygofer (see key).

Balclutha youngi, new species

FIGURE 16

Length of male 4.4 to 4.6 mm; head width .900 to .950 mm; pronotal width .925 to 1.000 mm; female unknown.

Head distinctly narrower than pronotum; vertex usually no longer medially than next to eye, interocular width more than three times

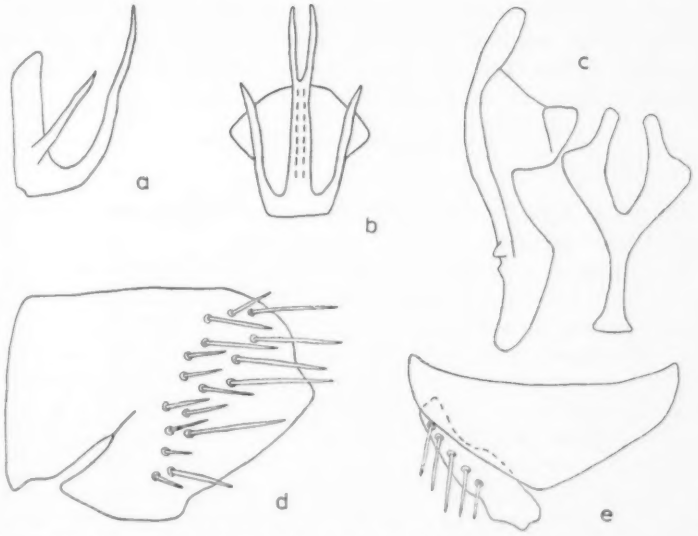

FIGURE 16.—*B. youngi: a*, aedeagus, lateral view; *b*, aedeagus, posteroventral view; *c*, style and connective, dorsal view; *d*, male pygofer, lateral view; *e*, valve and plate, ventral view.

median length; ocellus located at a distance of from one to two times its diameter from eye; anteclypeus slightly wider apically, not exceeding gena; postclypeal sutures parallel above antennal pits; pronotum more than three times as long as vertex; hind femoral chaetotaxy 2-2-1.

Male pygofer with posterior margin not rounded, usually with more than 15 setae; plates short, blunt apically; connective expanded apically and truncate, two-thirds as long as style, stem and arms approximately equal in length; style with preapical lobe inconspicuous, apical extension stout, rounded apically and only slightly curved: aedeagus with dorsal apodeme conspicuous with a pair of long slender processes extending posteriorly, shaft slender, deeply incised apically, curved dorsally.

Color stramineous to green; face without oblique brown lines; vertex, pronotum, and scutellum with longitudinal yellow lines; thoracic venter not dark; forewings subhyaline with several small brown spots present in irregular patterns.

Holotype male, Nova Teutonia, Santa Catarina, Brazil, April 1953 (F. Plaumann), on indefinite loan to the U.S. National Museum from North Carolina State University. This species was described from four male specimens from Brazil (Apr., Oct., and Jan.).

B. youngi, new species, appears to be related to *B. hebe* (Kirkaldy). It can be readily distinguished from the latter by the shape of its aedeagus, the shape of the male plates, and the shape of the styles (see key). This species is named in honor of Dr. David A. Young of North Carolina State University.

***Balclutha fuscina*, new species**

FIGURE 17

Length of male 4.0 mm; head width .825 mm; pronotal width .850 mm; female unknown.

Head slightly narrower than pronotum; vertex as wide next to eye as medially, interocular width more than three times median length; ocellus located at a distance of slightly more than its diameter from eye; anteclypeus widest apically, exceeding gena; postclypeal sutures slightly curved mesally above antennal pits; pronotum approximately three times as long as vertex; hind femoral chaetotaxy 2–1–1.

Male pygofer with less than 15 setae, posteroventral margin with a short heavily sclerotized process extending posteriorly as far as pygofer apex; connective wide, expanded apically and bifid, approximately equal in length to style, stem slightly longer than arms; style with preapical lobe rounded, apical extension slightly curved and acute apically; aedeagus with shaft long and slender, a pair of short processes arising from base and extending posteriorly.

Color green to stramineous; face without oblique brown lines; thoracic venter not dark; forewings subhyaline with green tint.

Holotype male, Nova Teutonia, Santa Catarina, Brazil, May 1953 (F. Plaumann), on indefinite loan to the U.S. National Museum from

North Carolina State University. This species was described from this single specimen.

B. fuscina, new species, is closely related to *B. floridana* (DeLong and Davidson) but can be easily distinguished by the shape of the aedeagus (see key).

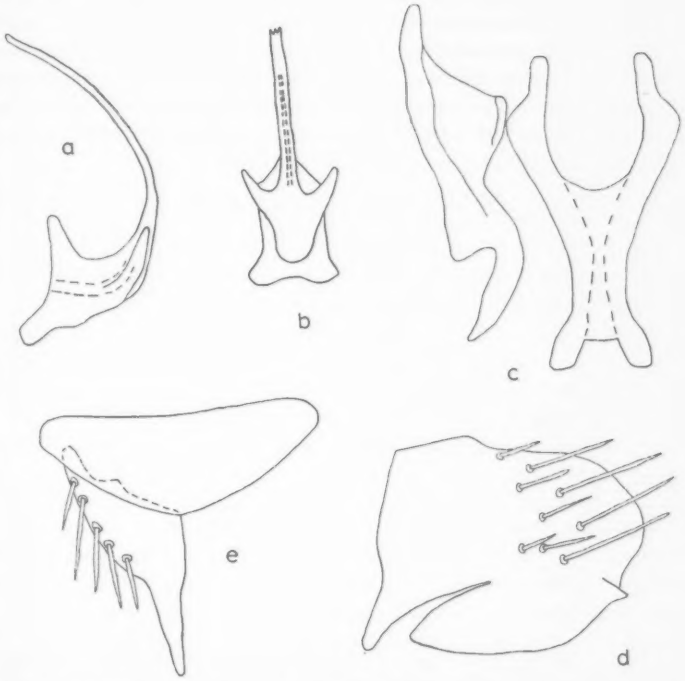

FIGURE 17.—*B. fuscina: a*, aedeagus, lateral view; *b*, aedeagus, posteroventral view; *c*, style and connective, dorsal view; *d*, male pygofer, lateral view; *e*, valve and plate, ventral view.

Balclutha caldwelli, new species

FIGURE 18

Length of male 3.1 to 3.4 mm, of female 3.1 to 3.8 mm; head width of male .725 to .850 mm, of female .800 to .875 mm; pronotal width of male .750 to .900 mm, of female .825 to .900 mm.

Head narrower than pronotum (occasionally very nearly as wide as pronotum); vertex usually longer medially than next to eye, interocular width three times median length or slightly less; ocellus located at a distance less than its diameter from eye; anteclypeus slightly wider

apically, equal to or slightly exceeding gena; postcylpeal sutures curved mesally above antennal pits; pronotum three times as long as vertex or slightly less; hind femoral chaetotaxy 2–1–1; female with posterior margin of abdominal sternum VII sinuate posteriorly, a heavily sclerotized band extending across posterior margin.

Male pygofer with less than 15 setae, ventral margin produced; plates slender, triangular, extending posteriorly as far as pygofer apex, connective expanded apically and truncate, equal in length to style, stem and arms equal in length, angle between arms approximately 45 degrees; style with preapical lobe rounded, apical extension slightly curved and acute; aedeagus tapered gradually from base to apex,

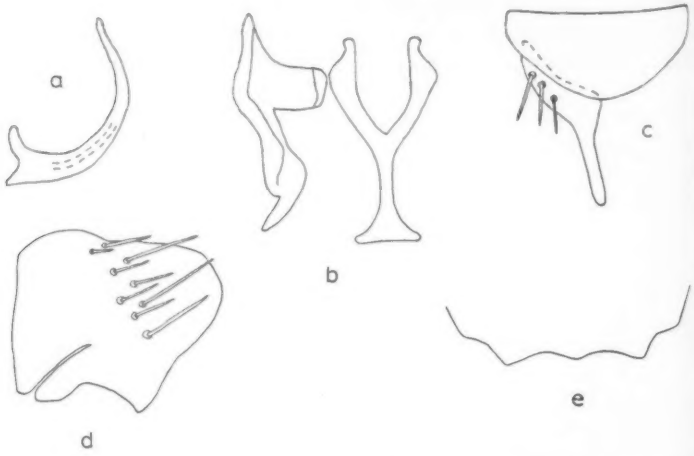

FIGURE 18.—*B. caldwelli: a*, aedeagus, lateral view; *b*, style and connective, dorsal view; *c*, valve and plate, ventral view; *d*, male pygofer, lateral view; *e*, female abdominal sternum VII, ventral view.

curved dorsally, shaft in posteroventral view with apex troughlike, dorsal margin exceeding ventral margin, slightly notched apically.

Color stramineous to brown; face without oblique brown lines; vertex and pronotum commonly irregularly marked with faint darker longitudinal lines or other orange-brown areas; scutellum usually with orange markings; thoracic venter usually dark; forewings hyaline to subhyaline, commonly concolorous with body color.

Holotype male from Experiment Station, Rio Piedras, Puerto Rico, July 11, 1917 (H. Morrison), in the U.S. National Museum. Paratype males, same data, in the U.S. National Museum and at North Carolina State University. This is a widespread subtropical and tropical

species, and numerous specimens have been examined from Flordia, Mexico, Puerto Rico, Cuba, Trinidad Island, Dominican Republic, Haiti, Jamaica, British Honduras, Panama, El Salvador, Surinam, Colombia, Peru, and British Guiana.

B. caldwelli, new species, appears to be related to *B. neglecta* (DeLong and Davidson) but can be distinguished from this species by the shape of the aedeagus (see key) and by the head which is narrower than the pronotum. Caldwell (1952) and Linnavuori (1959) applied the specific name of *virescens* (Osborn) to this taxon. In typical *virescens* the head is wider than the pronotum, and the female abdominal sternum VII does not resemble that of *caldwelli*. This species is named in honor of Dr. John S. Caldwell, formerly of Ohio State University.

Balclutha rufofasciata (Merino)

FIGURE 19

Nesosteles rufofasciatus Merino, 1936, Philippine Journ. Sci., vol. 61, p. 381.

Length of male 3.3 to 3.9 mm, of female 3.7 to 4.2 mm; head width of male .800 to .875 mm, of female .875 to .925 mm; pronotal width of male .825 to .925 mm, of female .875 to 1.000 mm.

Head usually as wide as pronotum; vertex as long next to eye as medially, interocular width three times median length; ocellus located at a distance of from less than to equal to its diameter from eye; anteclypeus parallel margined, exceeding gena; postclypeal sutures curved mesally above antennal pits; pronotum three times as long as vertex; hind femoral chaetotaxy 2–1–1; female with posterior margin of abdominal sternum VII notched medially.

Male pygofer with less than 15 setae, with a bifurcate heavily sclerotized process on inner surface extending posteriorly; plates broadly triangular, with many setae, apical one-fourth constricted, curved ventrally; connective expanded apically and deeply bifid, approximately equal in length to style, stem slightly longer than arms; style with preapical lobe acute, apical extension long, strongly curved laterally, acute apically; aedeagus with preatrium conspicuous, dorsal apodeme extending anterodorsally, shaft gradually narrowed, slender in apical one-half, curved dorsally then anteriorly.

Color stramineous; face without oblique brown lines; thoracic venter not dark; forewings subhyaline with third apical cell dark brown, other cells commonly partially or wholly brown or red in color.

Type not located; the above redescription is from a series of specimens from St. Thomas, Virgin Islands (Nov.) located at the U.S. National Museum. It is also reported from Puerto Rico, Africa, the Philippines, and Oceania.

B. rufofasciata (Merino) appears to be related to *B. guajana* (DeLong) but can be distinguished by the shape of the aedeagus, the shape of the pygofer process, and the forewing coloration (see key).

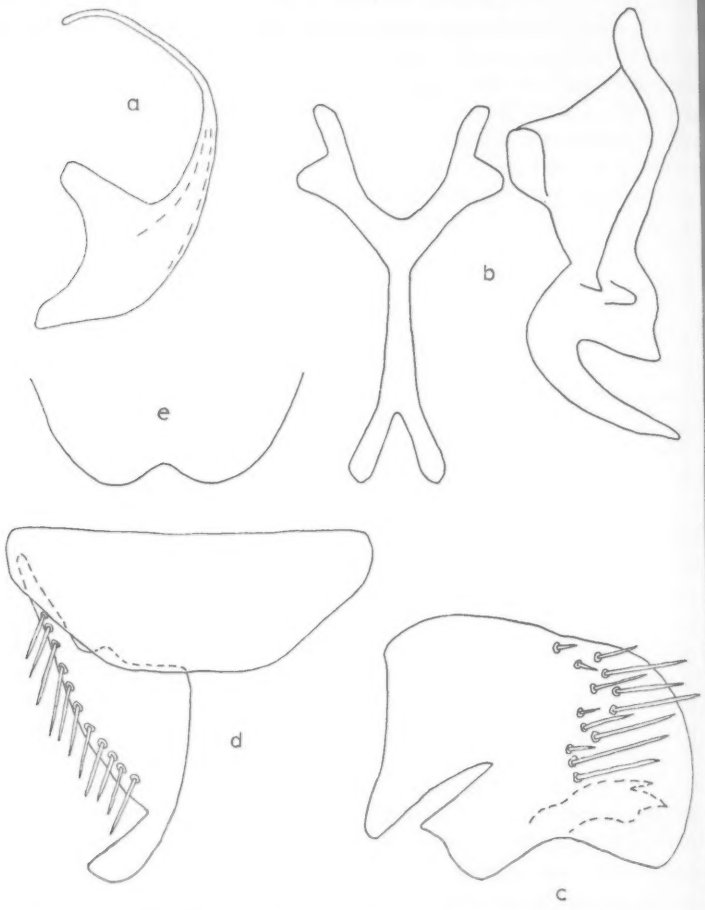

FIGURE 19.—*B. rufofasciata: a*, aedeagus, lateral view; *b*, style and connective, dorsal view; *c*, male pygofer, lateral view; *d*, valve and plate, ventral view; *e*, female abdominal sternum VII, ventral view.

***Balclutha guajanae* (DeLong), new combination**

FIGURE 20

Eugnathodus guajanae DeLong 1923, *in* Wolcott, Journ. Dept. Agric. Porto Rico, vol. 7, p. 267.

Eugnathodus calcara DeLong and Davidson, 1933a, Ohio Journ. Sci., vol. 33, p. 57.

Length of male 3.2 to 3.7 mm, of female 3.3 to 4.0 mm; head width of male .800 to .875 mm, of female .875 to .925 mm; pronotal width of male .750 to .850 mm, of female .825 to .900 mm.

Head as wide as or wider than pronotum; vertex as long next to eye as medially, interocular width more than three times median length; ocellus located at a distance less than its diameter from eye; anteclypeus widest apically, exceeding gena; postclypeal sutures either parallel or slightly curved mesally above antennal pits; pronotum three

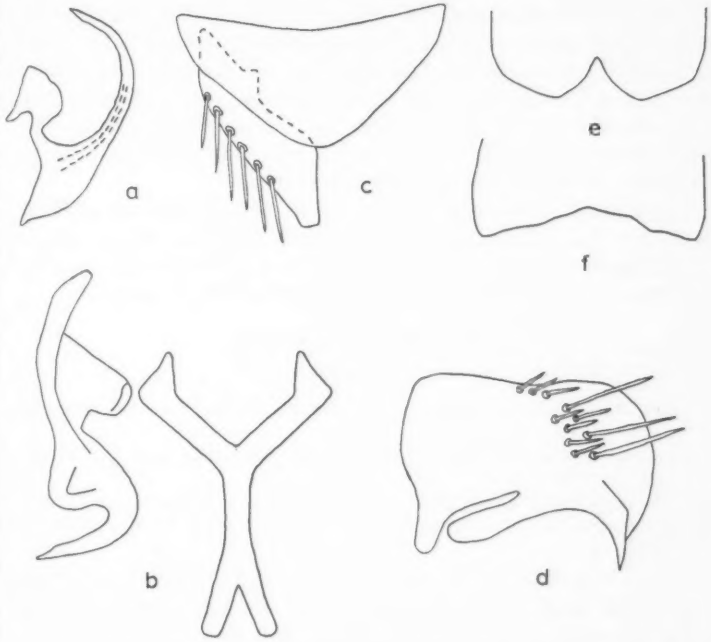

FIGURE 20.—*B. guajanae: a*, aedeagus, lateral view; *b*, style and connective, dorsal view; *c*, valve and plate, ventral view; *d*, male pygofer, lateral view; *e, f*, female abdominal sternum VII, ventral view.

times as long as vertex; hind femoral chaetotaxy 2–1–1; female with posterior margin of abdominal sternum VII rounded, notched mesally.

Male pygofer with less than 15 setae, a tapered process at posteroventral margin extending ventrally, its margin entire; plates broadly triangular; connective expanded apically, deeply bifid, equal in length to style, stem longer than arms which diverge at approximately 90 degrees; style with preapical lobe rounded, apical extension strongly

curved laterally, acute apically; aedeagus with dorsal apodeme conspicuous, expanded laterally and forming two lobes, shaft gradually narrowed, curved anteriorly.

Color tan; face without oblique brown lines; thoracic venter not dark; scutellum commonly with orange areas present; forewings hyaline to subhyaline.

The holotype of *E. guajanae*, a female from Rio Piedras, Puerto Rico, and the male holotype of *E. calcara*, both in the DeLong collection, have been examined. Linnavuori (1959, p. 339) placed *guajanae* in synonymy under *rosea* (Scott), but on the basis of material studied, Linnavuori's illustrations and Ribaut's (1952, p. 69) illustrations of *rosea* (Scott), *guajanae* is here removed from synonymy. This species is commonly found in Florida, Georgia, and Texas. One specimen from North Carolina has also been examined. Other localities from which material has been examined are Brazil, Mexico, Puerto Rico, Cuba, Jamaica, British Honduras, Panama, and British Guiana. It is commonly collected on sugarcane flowers.

B. guajanae (DeLong) appears to be closely related to *B. hebe* (Kirkaldy) but can be readily distinguished by the unique shape of the aedeagus and by the position of the pygofer process (see key). The apical end of the connective is also more bifid in *guajanae*.

Balclutha hebe (Kirkaldy)

FIGURE 21

Nesosteles hebe Kirkaldy, 1906, Bull. Hawaiian Sugar Planters' Assoc. Exp. Sta. Div. Ent., vol. 1, p. 343.

Eugnathodus bisinuatus DeLong, 1923, *in* Wolcott, Journ. Dept. Agric. Porto Rico, vol. 7, p. 266.

Eugnathodus pallidus Osborn, 1926, Ann. Ent. Soc. America, vol. 19, p. 352.

Eugnathodus bifurcata DeLong and Davidson, 1933a, Ohio Journ. Sci., vol. 33, p. 58.

Length of male 3.0 to 3.7 mm, of female 3.3 to 4.0 mm; head width of male .750 to .800 mm, of female .775 to .900 mm; pronotal width of male .725 to .800 mm, of female .750 to .900 mm.

Head as wide as or wider than pronotum; vertex as long next to eye as medially, interocular width more than three times median length; ocellus located at a distance equal to or slighly less than its diameter from eye; anteclypeus widest apically, exceeding gena; postclypeal sutures curved mesally above antennal pits; pronotum more than three times as long as vertex; hind femoral chaetotaxy 2–1–1; female with posterior margin of abdominal sternum VII with rounded median heavily sclerotized lobe which is indented on each side.

Male pygofer heavily setose (usually 15 or more setae), a tapered process at posteroventral margin extending mesally, process with margins entire or irregularly dentate; plates broadly triangular,

apical one-third sharply curved dorsally; connective expanded apically, slightly bifid, slightly less than style in length, stem twice as long as arms; style with preapical lobe rounded, apical extension prominent, acute apically, aedeagus with dorsal apodeme greatly

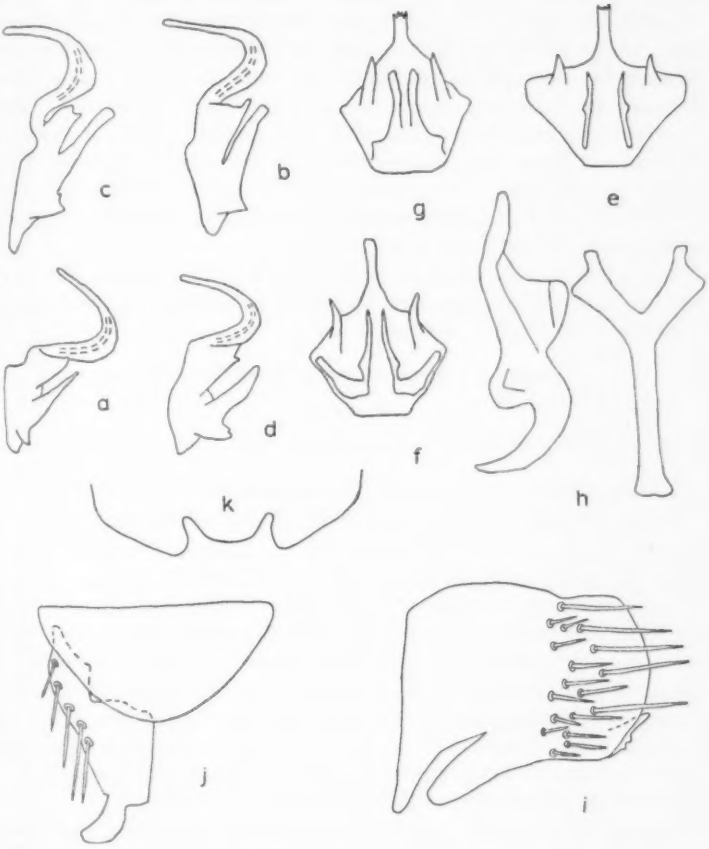

FIGURE 21.—*B. hebe: a–d*, aedeagus, lateral view; *e–g*, aedeagus, posteroventral view; *h*, style and connective, dorsal view; *i*, male pygofer, lateral view; *j*, valve and plate, ventral view; *k*, female abdominal sternum VII, ventral view.

expanded, three pairs of processes extending posteriorly from its base, shaft slender, curved anteriorly.

Color including thoracic venter from green to light brown; forewings hyaline or subhyaline; abdominal dorsum dark.

Holotype not located; however, the holotypes of *E. bisinuatus* DeLong, *E. bifurcata* DeLong and Davidson, and *E. pallidus* Osborn have been examined. This is one of the most common species found in tropical and subtropical areas. Numerous specimens have been examined from Florida, Georgia, Mississippi (one specimen), North Carolina (one specimen), and Texas. Specimens from Mexico, Puerto Rico, Cuba, Haiti, Dominican Republic, British Honduras, Panama, Guatemala, Costa Rica, Surinam, Colombia, Brazil, Ecuador, Peru, Bolivia, and Paraguay have also been examined. Host data taken from labels include *Flaveria linearis* Laq., *Panicum purpurascens* Raddi, *P. barbinode* Trin., and Johnson grass. *F. linearis* is a member of the family Compositae. Since grasses and sedge are considered to be the food hosts of *Balclutha* species, there is some question about the authenticity of this plant as a food host.

B. hebe (Kirkaldy) appears to be related to *B. guajanae* (DeLong) but can be easily distinguished by the three pairs of processes arising from the base of the aedeagus in *hebe*.

Balclutha floridana (DeLong and Davidson)

FIGURE 22

Eugnathodus floridana DeLong and Davidson, 1933a, Ohio Journ. Sci., vol. 33, p. 56.

Nesosteles marquesana Osborn, 1934, Bull. Bernice P. Bishop Mus., vol. 114, p. 263.

Length of male 2.5 to 3.4 mm, of female 2.5 to 3.5 mm; head width of male .625 to .775 mm, of female .625 to .825 mm; pronotal width of male .625 to .750 mm, of female .600 to .800 mm.

Head as wide as or wider than pronotum; vertex as long next to eye as medially or occasionally slightly longer medially, interocular width more than three times median length; ocellus located at a distance of from less than to equal to its diameter from eye; anteclypeus widest apically, exceeding gena; postclypeal sutures usually parallel above antennal pits; pronotum three times as long as vertex; hind femoral chaetotaxy 2–1–1; female with posterior margin of abdominal sternum VII rounded posteriorly, slightly sinuate.

Male pygofer with less than 15 setae; plates triangular, apical half constricted, extending posteriorly as far as pygofer apex; connective wide, expanded apically and bifid, distinctive, approximately equal in length to style; style with preapical lobe rounded, apical extension slightly curved and acute apically, anterior margin oblique; aedeagus with shaft long and slender, curved sharply dorsally then anteriorly, commonly extending into abdominal segment VIII.

Color from light green to stramineous; face without oblique brown lines; thoracic venter not dark; forewings hyaline to subhyaline commonly tinted as body color.

The male holotype, La Belle, Fla., Apr. 21, 1921, is in the DeLong collection and has been examined. This species is commonly found in tropical and subtropical areas. Specimens have been examined

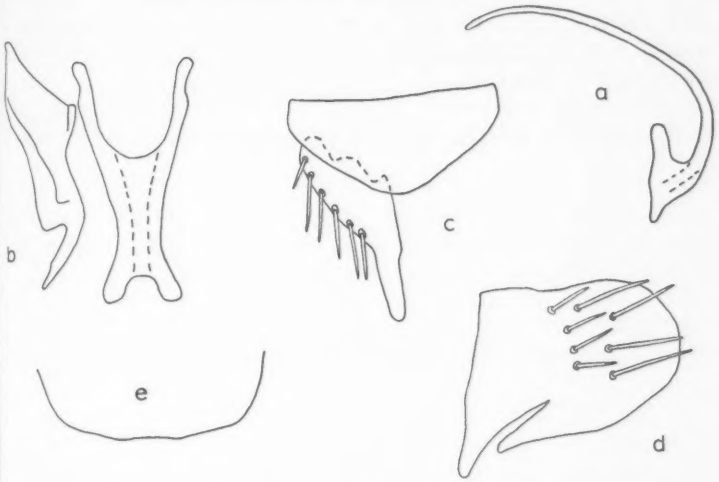

FIGURE 22.—*B. floridana: a*, aedeagus, lateral view; *b*, style and connective, dorsal view; *c*, valve and plate, ventral view; *d*, male pygofer, lateral view; *e*, female abdominal sternum VII, ventral view.

from Florida, Georgia, South Carolina, Texas, Mexico, Puerto Rico, Cuba, Haiti, Dominican Republic, Jamaica, British Honduras, Panama, Guatemala, Brazil, Ecuador, and Peru.

B. floridana (DeLong and Davidson) is related to *B. fuscina*, new species, but can be distinguished by the absence of processes on the shaft of the aedeagus and by the head width which is as wide as or wider than the pronotum in *floridana*.

Balclutha neglecta (DeLong and Davidson)

FIGURE 23

Eugnathodus neglecta DeLong and Davidson, 1933a, Ohio Journ. Sci., vol. 33, p. 55.

Length of male 2.8 to 3.8 mm, of female 3.2 to 4.0 mm; head width of male .675 to .875 mm, of female .775 to .900 mm; pronotal width of male .675 to .875 mm, of female .725 to .925 mm.

Head as wide as or wider than pronotum; vertex usually as long next to eye as medially (longer medially in some specimens), interocular width more than three times median length; ocellus variable, located at a distance of from less than to greater than its diameter

from eye; anteclypeus parallel margined, apex attaining or exceeding gena slightly; postclypeal sutures curved mesally above antennal pits; pronotum three times as long as vertex; hind femoral chaetotaxy 2–1–1; female with posterior margin of abdominal sternum VII irregularly truncate or slightly convex posteriorly, with or without a small median projection, with a heavily sclerotized band across posterior margin.

Male pygofer not heavily setose; plates slender; triangular; connective expanded apically and truncate, approximately equal in length

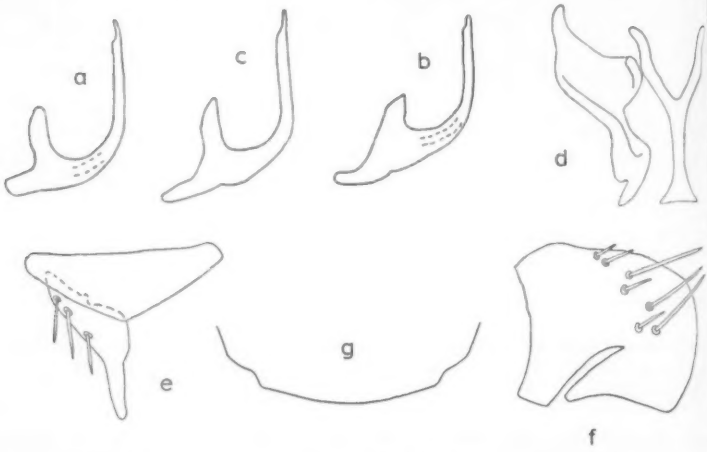

FIGURE 23.—*B. neglecta: a–c*, aedeagus, lateral view; *d*, style and connective, dorsal view; *e*, valve and plate, ventral view; *f*, male pygofer, lateral view; *g*, female abdominal sternum VII, ventral view.

to style, stem slightly longer than arms which diverge at approximately 45 degrees; style with preapical lobe rounded, apical extension only slightly curved and rounded apically; aedeagus with preatrium conspicuous, curved ventrally only slightly if at all, shaft with apical two-thirds curved dorsally.

Color light brown; face with or without oblique brown lines on each side of midline; pronotum commonly with brown longitudinal lines; thoracic venter dark; scutellum commonly with faint orange areas; forewings hyaline to subhyaline, usually with a tan tint; abdominal dorsum dark.

The male holotype from Mount Manitou, Mont., is in the DeLong collection and has been examined. This is a widespread species, and specimens have been examined from Arizona, California, Colorado, Florida, Idaho, Iowa, Kansas, Mississippi, Missouri, Montana,

Nebraska, Nevada, New Mexico, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, Wisconsin, Wyoming, Ontario, and Manitoba. Other material examined was from Mexico, Puerto Rico, Panama, Ecuador, Peru, and Chile.

B. neglecta (DeLong and Davidson) is closely related to *B. aridula* Linnavuori from which it can be distinguished by the curvature of the aedeagus (see key).

Balclutha aridula Linnavuori

FIGURE 24

Balclutha aridula Linnavuori, 1959, Ann. Zool. Soc. 'Vanamo,' vol. 20, p. 344.

Length of male 2.8 to 3.5 mm, of female 3.1 to 3.8 mm; head width of male .700 to .850 mm, of female .750 to .900 mm; pronotal width of male .675 to .825 mm, of female .725 to .900 mm.

Head as wide as or wider than pronotum; vertex as long next to eye as medially or slightly longer medially, interocular width approxi-

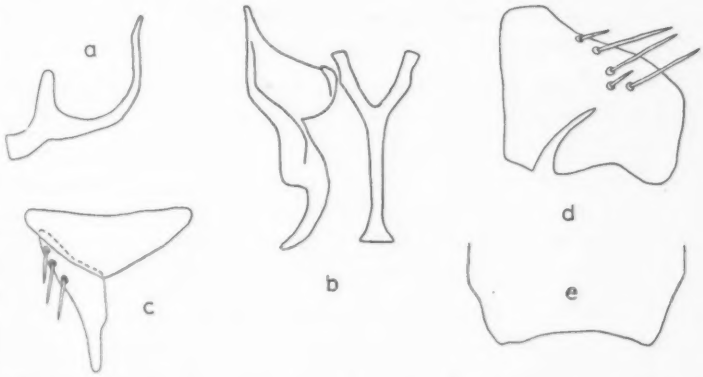

FIGURE 24.—*B. aridula: a*, aedeagus, lateral view; *b*, style and connective, dorsal view; *c*, valve and plate, ventral view; *d*, male pygofer, lateral view; *e*, female abdominal sternum VII, ventral view.

mately three times median length; ocellus located at a distance of from 1 to 1½ times its diameter from eye; anteclypeus parallel sided, exceeding gena; postclypeal sutures usually curved mesally above antennal pits; pronotum with length varying from slightly less than to 3 times as long as vertex; hind femoral chaetotaxy 2–1–1, female with posterior margin of abdominal sternum VII shallowly concave, with a heavily sclerotized band extending along posterior margin.

Male pygofer and plates as *B. neglecta;* connective expanded apically and truncate, slightly shorter than style, stem approximately twice as long as arms; style with preapical lobe and apical extension rounded; aedeagus with preatrium prominent, curved ventrally then anteriorly, shaft extending posteriorly for more than one-half its length, then curved dorsally, tapered at apex.

Color from brown to greenish yellow; face commonly with oblique brown lines on each side of midline; head and pronotum commonly with longitudinal brown stripes and/or orange areas on dorsal surface; thoracic venter dark; forewings hyaline to subhyaline.

The female holotype in the Hungarian Natural History Museum, Budapest, and a male paratype from the collection of R. Linnavuori have been examined. A large number of additional specimens have been examined from Chile, Peru, and some from Costa Rica.

B. aridula Linnavuori is closely related to *B. neglecta* (DeLong and Davidson) but can be distinguished by the shape of the preatrium of the aedeagus and by the curvature of the shaft (see key).

***Balclutha cochrani*, new species**

FIGURE 25

Length of male 3.1 to 3.2 mm, of female 3.4 to 3.6 mm; head width of male .850 mm, of female .875 to .950 mm; pronotal width of male .800 mm, of female .825 to .875 mm.

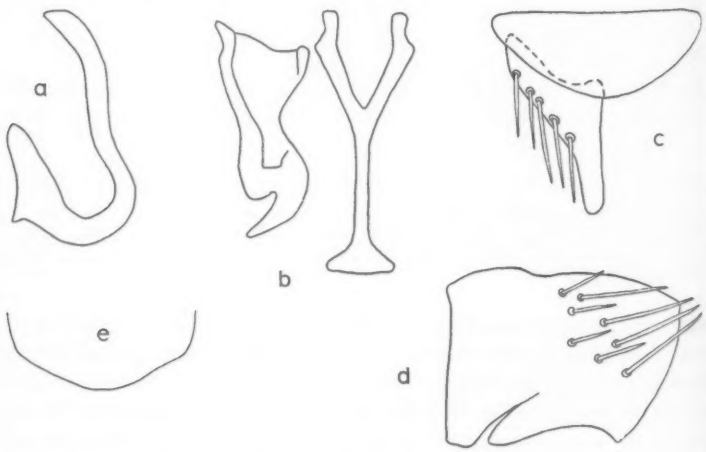

FIGURE 25.—*B. cochrani: a*, aedeagus, lateral view; *b*, style and connective, dorsal view; *c*, valve and plate, ventral view; *d*, male pygofer, lateral view; *e*, female abdominal sternum VII, ventral view.

Head wider than pronotum; vertex slightly longer medially than next to eye, interocular width slightly less than three times median length; ocellus located at a distance of from 1 to 1½ times its diameter from eye; anteclypeus slightly widened apically, not exceeding gena; postclypeal sutures curved mesally above antennal pits; pronotum less than 3 times as long as vertex; hind femoral chaetotaxy 2–1–1; female with posterior margin of abdominal sternum VII irregularly convex posteriorly.

Male pygofer with less than 10 setae, posteroventral margin projected ventrally; plates broadly triangular, not extending as far as pygofer apex; connective expanded apically, truncate, longer than style, stem longer than arms; style with preapical lobe rounded, apical extension slightly curved, tapered, rounded apically; aedeagus with dorsal apodeme curved anteriorly, shaft broad in lateral view, curved ventrally then dorsally.

Color stramineous; face without oblique brown lines; thoracic venter not dark, forewings hyaline with stramineous tint.

Holotype and paratype males, Pese, Panama, Oct. 22, 1952 (F. S. Blanton), in the U.S. National Museum. This species was described from these two specimens and five female specimens with the same data.

B. cochrani, new species, is apparently closely related to *B. neglecta* (DeLong and Davidson) but can be distinguished by the curvature and width of the aedeagus and its inconspicuous preatrium (see key). This species was named in honor of Dr. James H. Cochran, head of the Department of Entomology and Zoology at Clemson University, who guided the author through his early career as an entomologist and remains a faithful friend.

Balclutha denticula, new species

FIGURE 26

Length of male 2.7 mm; head width .775 mm; pronotal width .750 mm; female unknown.

Head wider than pronotum; vertex as long next to eye as medially, interocular width more than three times median length; ocellus located at a distance less than its diameter from eye; anteclypeus parallel margined, slightly exceeding gena; postclypeal sutures curving mesally above antennal pits; pronotum three times as long as vertex; hind femoral chaetotaxy 2–1–1.

Male pygofer with less than 10 setae, exceeding plates in length; plates broadly triangular, apical one-fourth constricted; connective approximately equal in length to style, stem and arms equal in length; style with preapical lobe acute, apical extension slightly curved, acute apically; aedeagus with a pair of processes arising ventrally at base,

curved dorsally and overlapping shaft, dentate on posterior margin; shaft slender, curving anteriorly, rounded apically.

Color tan; face with faint oblique brown lines on each side of midline; thoracic venter dark.

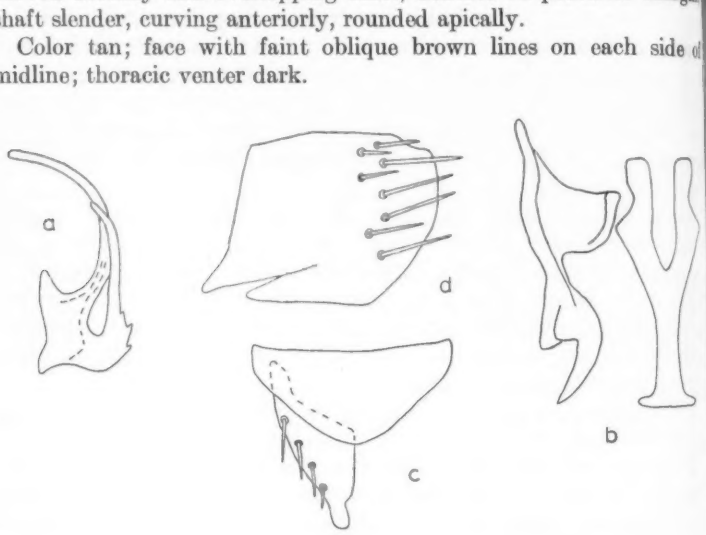

FIGURE 26.—*B. denticula: a*, aedeagus, lateral view; *b*, style and connective, dorsal view; *c*, valve and plate, ventral view; *d*, male pygofer, lateral view.

Holotype male, Pese, Panama, Oct. 22, 1952 (F. S. Blanton) in the U.S. National Museum. This species was described from this single specimen.

B. denticula, new species, appears to be related to *B. cochrani*, new species, but can be readily distinguished by the dentate aedeagal processes in *denticula*.

Balclutha lineata (Osborn)

FIGURE 27

Eugnathodus lineatus Osborn, 1925, Ann. Carnegie Mus., vol. 15, p. 449.
Eugnathodus flavidus Osborn, 1926, Ann. Ent. Soc. America, vol. 19, p. 351.

Length of male 2.7 to 3.2 mm, of female 3.0 to 3.6 mm; head width of male .750 to .800 mm, of female .800 to .900 mm; pronotal width of male .700 to .775 mm, of female .775 to .875 mm.

Head wider than pronotum; vertex longer medially than next to eye, interocular width from less than to approximately three times median length; ocellus located at a distance less than its diameter from eye; anteclypeus widest apically, exceeding gena; postclypeal sutures parallel above antennal pits; pronotum less than three times as long as vertex; hind femoral chaetotaxy 2–1–1 or 2–2–1; female with posterior margin of abdominal sternum VII irregularly concave.

Male pygofer with less than 15 setae; plates broadly triangular, elongate apically; connective expanded and bifid apically, equal in length to style, stem and arms nearly equal in length; style with preapical lobe rounded, apical extension tapered slightly, rounded apically; aedeagus with dorsal apodeme prominent, shaft robust, curved dorsally then anteriorly then ventrally, apical one-fourth constricted, shaft in dorsal view with apical one-fourth expanded, bifid apically.

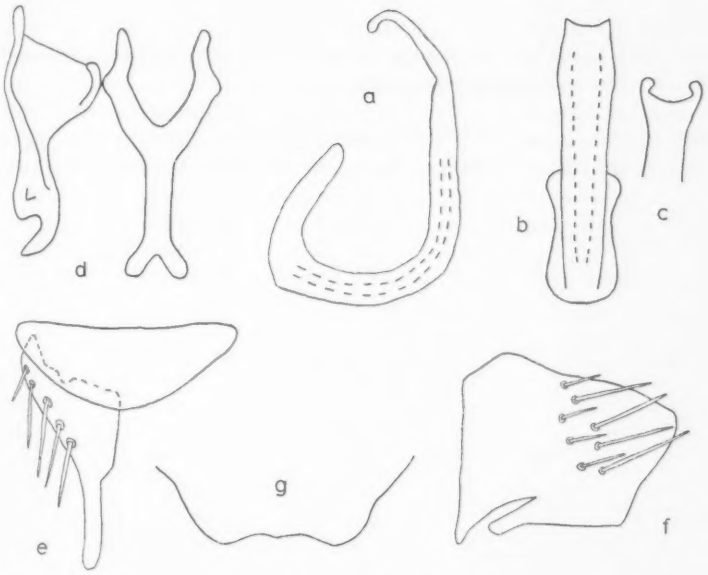

FIGURE 27.—*B. lineata: a*, aedeagus, lateral view; *b*, aedeagus, posteroventral view; *c*, aedeagal shaft apex, dorsal view; *d*, style and connective, dorsal view; *e*, valve and plate, ventral view; *f*, male pygofer, lateral view; *g*, female abdominal sternum VII, ventral view.

Color stramineous; face without oblique brown lines; vertex, pronotum, and scutellum irregularly marked with bright yellow stripes or other markings; legs brown in color; forewings subhyaline, marked irregularly with yellow bands, third apical cell with costal half marked with a heavy brown stripe which commonly extends into anteapical cell area.

The holotype has not been located. The female holotype of *E. flavidus* Osborn has been examined and is in the U.S. National Museum. A long series of specimens has been examined from Panama and British

Honduras. Specimens from Mexico and Cuba have also been examined. This species has also been reported from Bolivia (type locality) and Puerto Rico.

B. lineata (Osborn) appears to be related to *B. guajanae* (DeLong) but can be easily distinguished by the shape and curvature of the aedeagus (see key). The external color markings on the forewings and the brown color of the legs are also usually diagnostic.

***Balclutha chiasma*, new species**

FIGURE 28

Length of male 3.1 to 3.3 mm; head width .800 mm; pronotal width .775 to .800 mm; female unknown.

Head as wide as or wider than pronotum; vertex as long next to eye as medially, interocular width more than three times median length; ocellus located at a distance less than its diameter from eye; ante-

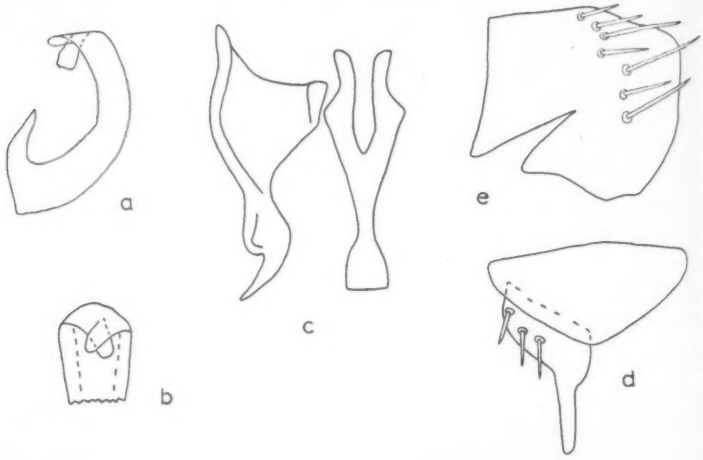

FIGURE 28.—*B. chiasma: a*, aedeagus, lateral view; *b*, aedeagus, dorsal view; *c*, style and connective, dorsal view; *d*, valve and plate, ventral view; *e*, male pygofer, lateral view.

clypeus parallel margined or slightly wider apically, exceeding gena slightly; postclypeal sutures curving mesally above antennal pits; pronotum more than three times as long as vertex; hind femoral chaetotaxy 2–1–1.

Male pygofer with less than 10 setae; plates slender, triangular; connective expanded apically and truncate, slightly shorter than style, stem slightly longer than arms; style with preapical lobe rounded, apical extension slightly curved, acute apically; aedeagus with dorsal

apodeme prominent, curved posteriorly, shaft broad in lateral view, apex forming two lobes which overlap diagonally.

Color stramineous to light brown; face with faint trace of oblique brown lines on each side of midline; thoracic venter dark; forewings hyaline with yellowish brown tint.

Holotype and paratype males from Fortin, V. C. [E. Mexico], Oct. 9, 1941 (DeLong, Good, Caldwell, and Plummer). This species was described from these two specimens. Holotype in the DeLong collection.

B. chiasma, new species, appears to be related to *B. lineata* (Osborn) but can be readily distinguished by the shorter shaft and the overlapping lobes at the apex of the aedeagus in *chiasma*.

Balclutha flavescens (Baker)

FIGURE 29

Eugnathodus flavescens Baker, 1903, Invert. Pacifica, vol. 1, p. 2.

Eugnathodus virescens Osborn, 1926, Ann. Ent. Soc. America, vol. 19, p. 351. [New synonymy.]

Eugnathodus abbreviata DeLong and Davidson, 1933a, Ohio Journ. Sci., vol. 33, p. 57.

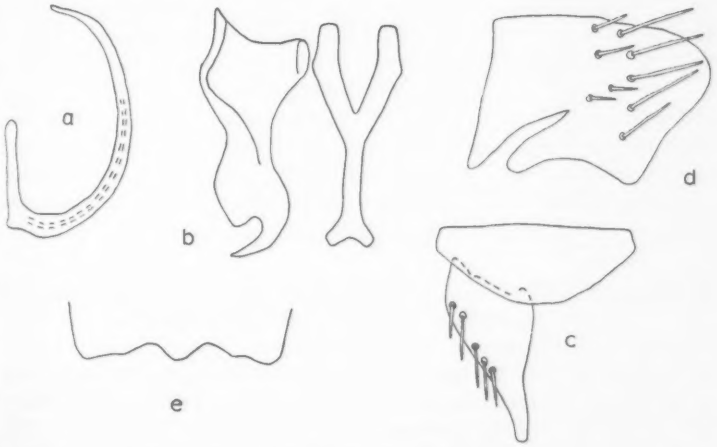

FIGURE 29.—*B. flavescens: a*, aedeagus, lateral view; *b*, style and connective, dorsal view; *c*, valve and plate, ventral view; *d*, male pygofer, lateral view; *e*, female abdominal sternum VII, ventral view.

Length of male 2.5 to 2.8 mm, of female 2.8 to 3.2 mm; head width of male .700 to .750 mm, of female .725 to .850 mm; pronotal width of male .675 to .725 mm, of female .700 to .800 mm.

Head wider than pronotum; vertex as long next to eye as medially or slightly longer medially, interocular width more than three times median length; ocellus located at a distance equal to or slightly more than its diameter from eye; anteclypeus slightly wider apically, not exceeding gena; postclypeal sutures parallel above antennal pits; pronotum from slightly less than to three times as long as vertex; hind femoral chaetotaxy 2–1–1 or 2–2–1; female with posterior margin of abdominal sternum VII sinuate posteriorly, with a rounded median lobe.

Male pygofer not heavily setose, with a small lobe on posteroventral margin; plates broadly triangular; connective expanded apically and

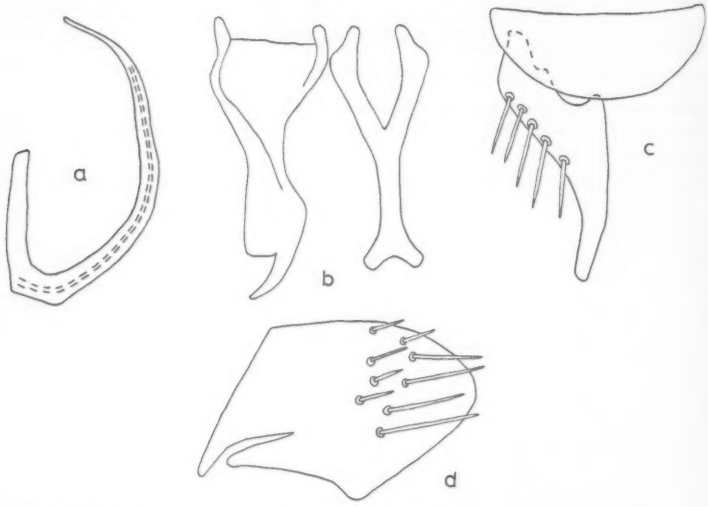

FIGURE 30.—*B. robusta: a*, aedeagus, lateral view; *b*, style and connective, dorsal view; *c*, valve and plate, ventral view; *d*, male pygofer, lateral view.

bifid, approximately equal in length to style, stem slightly longer than arms which diverge at approximately 30 degrees; style with preapical lobe rounded, apical extension strongly curved laterally, acute apically; aedeagus with dorsal apodeme prominent, shaft evenly curved dorsally then ventrally, gradually tapered, rounded apically.

Color stramineous to light green; face without oblique brown lines; thoracic venter not dark; forewings hyaline to subhyaline, usually tinted as body color.

All efforts to locate the holotype of *B. flavescens* (Baker) have been unsuccessful. The descriptions of Baker (1903) and Osborn (1926)

can be, in the opinion of the author, applied to several taxa. Linnavuori (1959) included an illustration of an aedeagus with his description, and his interpretation of this species is followed here. The female holotype of *E. virescens* in the U.S. National Museum and male holotype of *E. abbreviata* in the DeLong collection have been examined.

B. flavescens (Baker) is very closely related to *B. robusta* (Caldwell) and *B. curvata* Caldwell but can be distinguished by the shape of the aedeagus and less accurately by characters on the styles and connective (see key).

Balclutha robusta (Caldwell)

FIGURE 30

Nesosteles robusta Caldwell, 1952, *in* Caldwell and Martorell, Journ. Dept. Agric. Porto Rico, vol. 34, p. 85.

Length of male 2.7 to 3.7 mm; head width .750 to .850 mm; pronotal width .725 to .850 mm; female measurements not included.

Head as wide as or wider than pronotum; vertex as long next to eye as medially or slightly longer medially, interocular width approximately three times median length; ocellus located at a distance approximately equal to its diameter from eye; anteclypeus widest apically, not exceeding gena; postclypeal sutures slightly curved mesally above antennal pits; pronotum approximately three times as long as vertex; hind femoral chaetotaxy 2–2–1.

Male pygofer and plates as *B. flavescens;* connective expanded apically and bifid, slightly shorter than style, stem and arms approximately equal in length; style with preapical lobe rounded, apical extension arising from dorsum and extending ventrolaterally; aedeagus with dorsal apodeme prominent, shaft unevenly curved, tapered, rounded apically.

Color stramineous; face without oblique brown lines; thoracic venter not dark; forewings hyaline to subhyaline.

The male holotype, Puerto Rico, in the U.S. National Museum has been examined. Additional material examined was from Mexico, British Honduras, Panama, Puerto Rico, Colombia, Peru, Brazil, and Paraguay.

B. robusta (Caldwell) is very closely related to *B. flavescens* (Baker), and the differences are often subtle. The preapical lobe of the style is more evenly rounded in *robusta;* the aedeagus is less evenly curved and longer than in *flavescens.* The characters of sternum VII in the female have been described by Caldwell (1952) and Linnavuori (1959), but the author has not definitely identified females of this species.

Balclutha curvata Caldwell

FIGURE 31

Balclutha curvata Caldwell, 1952 *in* Caldwell and Martorell, Journ. Dept. Agric. Porto Rico, vol. 34, p. 81.

Length of male 2.7 to 2.9 mm; head width .750 to .850 mm; pronotal width .700 to .775 mm; female measurements not included.

Head wider than pronotum; vertex as long next to eye as medially or slightly longer medially, interocular width approximately three times median length; ocellus located at a distance approximately equal to its diameter from eye; anteclypeus slightly wider apically, not exceeding gena; postclypeal sutures parallel above antennal pits;

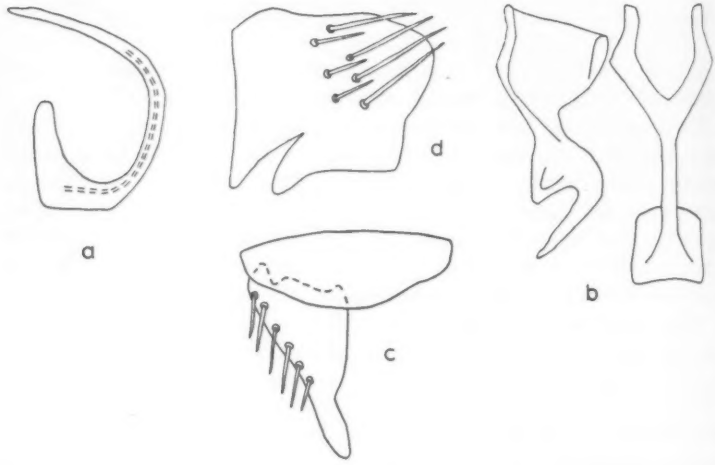

FIGURE 31.—*B. curvata: a*, aedeagus, lateral view; *b*, style and connective, dorsal view; *c*, valve and plate, ventral view; *d*, male pygofer, lateral view.

pronotum usually less than three times as long as vertex; hind femoral chaetotaxy 2–1–1 or 2–2–1.

Male pygofer and plates as *B. flavescens;* connective expanded apically, truncate, apex rectangular, slightly longer than style, stem slightly longer than arms; style with preapical lobe forming approximately a 45° angle, apical extension tapered, acute apically; aedeagus with dorsal apodeme prominent, approximately one-third as long as shaft which is regularly but strongly curved anteriorly.

Color light green to stramineous; face without oblique brown lines on each side of midline or faint if present; thoracic venter not dark; forewings hyaline to subhyaline.

The male holotype, Puerto Rico, in the U.S. National Museum has been examined. Other specimens examined were from Florida, Puerto Rico, Panama, and Surinam.

B. curvata Caldwell is very closely related to *B. flavescens* (Baker) but can be distinguished by several characters. The preapical lobe of the style forms a more acute angle; the apex of the connective is rectangular and truncate; and the aedeagus is more strongly curved anteriorly in *curvata*.

***Balclutha knulli* (Davidson and DeLong), new combination**

FIGURE 32

Agellus knulli Davidson and DeLong, 1935, Proc. Ent. Soc. Washington, vol. 37, p. 109.

Length of male 2.9 to 3.0 mm, of female 2.8 to 3.1 mm; head width of male .800 to .825 mm, of female .800 to .825 mm; pronotal width of male .725 to .775 mm, of female .750 to .800 mm.

Head wider than pronotum; vertex usually as long next to eye as medially or slightly longer medially, interocular width approximately three times median length; ocellus located at a distance aprpoximately equal to its diameter from eye; anteclypeus slightly wider apically, not exceeding gena; postclypeal sutures parallel above antennal pits; pronotum with length from slightly less to three times length of vertex;

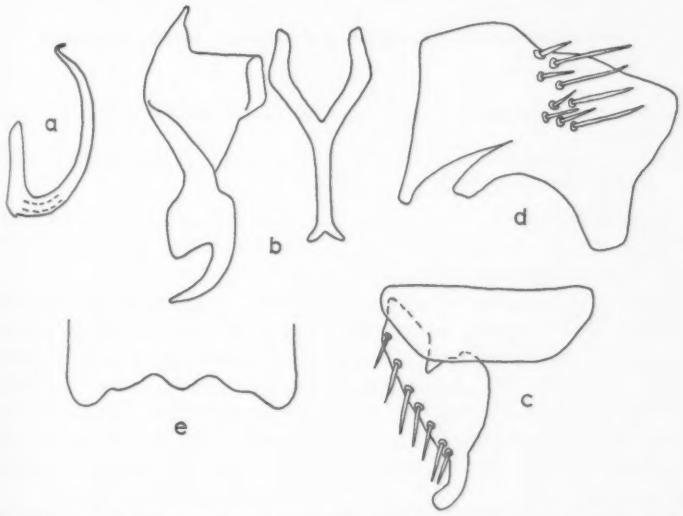

FIGURE 32.—*B. knulli: a*, aedeagus, lateral view; *b*, style and connective, dorsal view; *c*, valve and plate, ventral view; *d*, male pygofer, lateral view; *e*, female abdominal sternum VII, ventral view.

hind femoral chaetotaxy 2–1–1; female with posterior margin of abdominal sternum VII irregularly concave, with a rounded median lobe.

Male pygofer with posteroventral margin bearing a broad lobe which is bisected by a heavily sclerotized discal band extending obliquely almost to ventral margin, less than 15 setae present; plates broadly triangular, apical one-third curved dorsally; connective expanded apically and bifid, two-thirds length of style, stem and arms nearly equal in length, style with preapical lobe rounded, apical extension curved laterally, gradually tapered and rounded apically; aedeagus with dorsal apodeme one-half length of shaft which is regularly curved anteriorly, narrowed apically, and recurved posteriorly.

Color stramineous; face without oblique brown lines (faint trace in some females); thoracic venter not dark; forewings hyaline with tan tint.

The male holotype from Brownsville, Tex., in the DeLong collection has been examined. Additional material examined was from Texas (Mar. and June), Panama (Sept. and Oct.), and Cuba (Feb. and Mar.).

B. knulli (Davidson and DeLong) appears to be related to *B. incisa* (Matsumura) and *B. neglecta* (DeLong and Davidson) but can be readily distinguished by the recurved apex of the aedeagus and the shape of the pygofer of *knulli*.

Balclutha sandersi (Davidson and DeLong), new combination

FIGURE 33

Agellus sandersi Davidson and DeLong, 1935, Proc. Washington Ent. Soc., vol. 37, p. 108.

Nesosteles sandersi dubiata Caldwell, 1952, *in* Caldwell and Martorell, Journ. Dept. Agric. Porto Rico, vol. 34, p. 87.

Length of male 2.7 to 3.7 mm, of female 3.2 to 3.8 mm; head width of male .650 to .825 mm, of female .750 to .825 mm; pronotal width of male .650 to .800 mm, of female .750 to .850 mm.

Head as wide as or wider than pronotum; vertex as long next to eye as medially or slightly longer medially, interocular width three times median length; ocellus located at a distance more than twice its diameter from eye; anteclypeus wider apically, exceeding gena; postclypeal sutures parallel above antennal pits; pronotum three times as long as vertex; hind femoral chaetotaxy 2–2–1; female with posterior margin of abdominal sternum VII truncate or shallowly concave.

Male pygofer with less than 15 setae, posteroventral margin with slight projection; plates extending posteriorly as far as pygofer apex, rounded apically; connective expanded apically and bifid, slightly

longer than style, stem and arms approximately equal in length; style with preapical lobe rounded, apical extension slightly curved, tapered, rounded apically; aedeagus with dorsal apodeme and preatrium absent or inconspicuous, ventral margin produced basally, curved dorsally then anteriorly, shaft slender.

The male holotype, Gamboa, Canal Zone, in the DeLong collection has been examined. The holotype of *N. sandersi dubiata*, Puerto Rico, in the U.S. National Museum has also been examined. Additional specimens examined were from Mexico, Puerto Rico, British Honduras, Panama, and Chile.

B. sandersi (Davidson and DeLong) appears to be closely related to *B. incisa* (Matsumura) but can be distinguished by the connective which is bifid apically in *sandersi* and by the shape of the aedeagus (see key). Linnavuori (1959) listed *B. sandersi* and *N. sandersi dubiata* as synonyms of *B. incisa*.

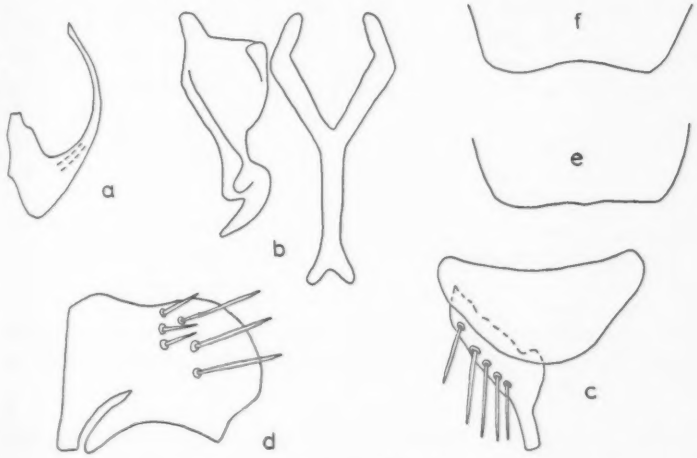

FIGURE 33.—*B. sandersi: a*, aedeagus, lateral view; *b*, style and connective, dorsal view; *c*, valve and plate, ventral view; *d*, male pygofer, lateral view; *e*, *f*, female abdominal sternum VII, ventral view.

Balclutha incisa (Matsumura)

FIGURE 34

Gnathodus incisus Matsumura, 1902, Természetr. Füzetek, vol. 25, p. 360.
Eugnathodus lacteus Baker, 1903, Invert. Pacifica, vol. 1, p. 2.
Eugnathodus minutus Osborn, 1929, Journ. Dept. Agric. Porto Rico, vol. 13. p. 101. [New synonymy.]
Eugnathodus neglecta var. *pallida* DeLong and Davidson, 1933a, Ohio Journ. Sci., vol. 33, p. 56. [New synonymy.]

Length of male 2.4 to 3.4 mm, of female 2.6 to 3.3 mm; head width of male .625 to .775 mm, of female .700 to .775 mm; pronotal width of male .600 to .750 mm, of female .625 to .750 mm.

Head as wide as or wider than pronotum; vertex as long next to eye as medially, interocular width more than three times median length; ocellus located at a distance approximately one-half its diameter from eye; anteclypeus parallel sided, equal to or slightly exceeding gena apically; postclypeal sutures conspicuously curved mesally above antennal pits; pronotum more than three times as long as vertex; hind femoral chaetotaxy 2–1–1; female with posterior margin of abdominal sternum VII sinuate posteriorly, with a median tooth.

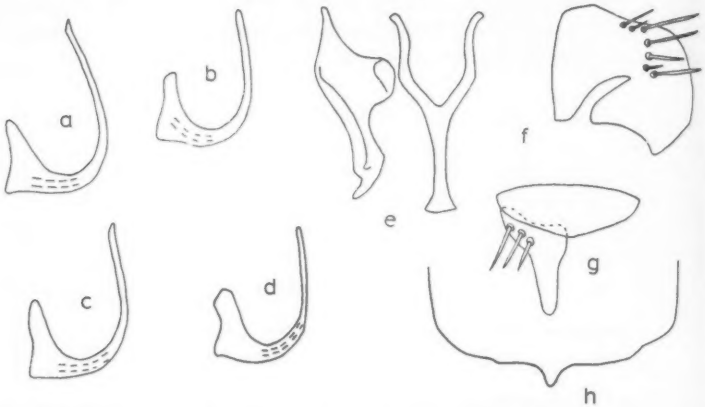

FIGURE 34.—*B. incisa: a–d*, aedeagus, lateral view; *e*, style and connective, dorsal view; *f*, male pygofer, lateral view; *g*, valve and plate, ventral view; *h*, female abdominal sternum VII, ventral view.

Male pygofer and plates as *B. neglecta;* connective expanded apically and truncate; approximately equal in length to style, stem and arms approximately equal in length; style with preapical lobe rounded, apical extension strongly curved laterally, rounded apically; aedeagus with no preatrium, shaft slender with apical two-thirds curved dorsally, rounded apically.

Color from green to stramineous to tan; face with or without oblique brown lines on each side of midline; pronotum commonly with dark longitudinal lines present; forewings usually hyaline, tinted as body color; thoracic venter commonly dark; abdomen with dorsum commonly dark.

The holotype has not been located, but it is probably in the Matsumura collection. Male paratypes of *E. minutus* Osborn and the

male holotype of *E. neglecta* var. *pallida* DeLong and Davidson in the DeLong collection have been examined. Specimens have been examined from Arizona, Arkansas, Florida, Georgia, Kansas, Michigan, Mississippi, New Mexico, New York, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas. Other specimens examined were from Mexico, Barbados, Puerto Rico, Trinidad Island, Panama, Guatemala, Colombia, Brazil, Ecuador, Peru, and Argentina. This species is reported from Japan and Oceania.

B. incisa (Matsumura) is closely related to *B. neglecta* (DeLong and Davidson) and to *B. diluta*, new species, but can be readily distinguished by the shape of the aedeagus (see key).

Balclutha diluta, new species

FIGURE 35

Length of male 3.0 to 3.3 mm, of female 3.0 to 3.3 mm; head width of male .750 to .775 mm, of female .750 to .850 mm; pronotal width of male .725 to .800 mm, of female .750 to .800 mm.

Head as wide as or wider than pronotum; vertex no longer medially than next to eye, interocular width more than three times median length; ocellus located at a distance of from less than to equal to its diameter from eye; anteclypeus parallel sided, slightly exceeding gena; postclypeal sutures curved mesally above antennal pits; pronotum more than three times as long as vertex; hind femoral chaetotaxy 2–1–1; female with posterior margin of abdominal sternum VII sinuate posteriorly, with a slightly produced median tooth.

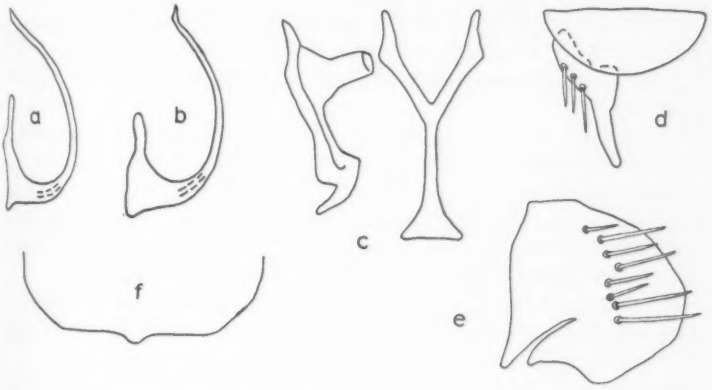

FIGURE 35.—*B. diluta: a*, *b*, aedeagus, lateral view; *c*, style and connective, dorsal view; *d*, valve and plate, ventral view; *e*, male pygofer, lateral view; *f*, female abdominal sternum VII, ventral view.

Male pygofer and plates as *B. neglecta;* connective expanded apically and truncate, equal to or slightly longer than style, stem slightly longer than arms; style with preapical lobe rounded, apical extension rounded and strongly curved laterally; aedeagus with preatrium inconspicuous, shaft long and slender, curving dorsally then anteriorly, acute apically.

Color tan; face without oblique brown lines; thorax with pale orange areas on dorsal surface, venter dark; forewings hyaline to subhyaline.

Holotype male, Nov. 2, 1932, Texas City, Tex. (L. D. Tuthill), at the University of Kansas. The following additional specimens have been examined: two males, Texas (Nov.), one male, Arkansas (Aug.), one male, Oklahoma (Sept.), and three males, Argentina (Mar., Jan., and Dec.).

B. diluta, new species, is closely related to *B. incisa* (Matsumura) but can be readily distinguished by the shape of the aedeagus which is curved distinctly anteroventrally in *diluta.*

Balclutha rosacea (Osborn), new combination

Eugnathodus rosaceus Osborn, 1929, Journ. Dept. Agric. Porto Rico, vol. 13, p. 102.

Length of female 3.3 to 3.6 mm; head width .850 to .900 mm; pronotal width .775 to .850 mm; male unknown.

Head wider than pronotum; vertex longer medially than next to eye, interocular width distinctly less than three times median length; ocellus located at a distance of from 1 to 1½ times its diameter from eye; anteclypeus widest apically, not exceeding gena; postclypeal sutures curved mesally above antennal pits; pronotum distinctly less than 3 times as long as vertex; hind femoral chaetotaxy 2-2-1; female with posterior margin of abdominal sternum VII broadly rounded.

Color from light to dark red; forewings hyaline to subhyaline, irregularly tinted red, veins commonly dark red.

Paratypes from Aguirre, Puerto Rico (Feb.), from the collection of Ohio State University have been examined. The species is redescribed above from these and three other specimens from Guanajibe, Puerto Rico (Feb.), in the U.S. National Museum.

B. rosacea (Osborn) appears to be closely related to *B. guajanae* (DeLong) but can be distinguished by the uniform red body color of *rosacea.* This species is known only from the female sex.

Nomina Dubia

Baker (1903) described a number of taxa with only a short description of each in the form of a key. Five of these names have not

been mentioned since, or their use has been included only in a species list with no further taxonomic clarification. These names are considered to be nomina dubia until such time as type material is found and studied, if it exists. These names are: *Gnathodus delicatus*, *G. tumidus*, *G. nevadensis*, *G. vermiculatus*, and *G. abdominalis* var. *nevadensis*.

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